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ABSTRACT

In response to a need for comparing test results from widely separated time periods and broad geographic areas in order to evaluate the achievement of today's students, a study was conducted to compare the reading achievement of sixth and tenth grade students in Indiana in 1944-1945 with Indiana children in the same grades in 1976 according to the Iowa Silent Reading Test. The 1976 procedure was set up to acquire data comparable to that of 1944-1945 and varied from the earlier one in that the questionnaire sent to participating school administrators requested additional information on student background, community, school personnel, and academic programs. With a grade adjustment for a ten month age difference, the 1976 sixth grade sample outscored their earlier counterparts on every subtest and on the total median score. The tenth grade scores, adjusted for age differences, indicated a dramatic improvement for the 1976 sophomores. The assumption that the reading abilities of students is presently declining is unsupported by the study. However, there is a need for further examination of the effects of certain societal and educational factors in each of the time periods. (Twenty-one tables are appended.) (MAI)

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THEN and NOW

Reading Achievement in Indiana (1944-45 and 1976)

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1978

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TABLE OF CONTENTS

PART PAGE

I INTRODUCTION. 1

A Then and Now Study Using Broad Data from Indiana. . 3
The Need for Scientific Comparison. 5
  Reading as a Comparison Measure. 7
    Concern over declining scores 7
    Increasing functional literacy. 10
    Other indicators. 13
    NAEP reading data 15
  An Attempt to Draw A Broadly Based Comparison. . . 16
    Replicating a broad Indiana study 17
    Considering context factors 18
    Objectives of the 1976 study. 19
    Contents of this report 19

II METHODS 21

General Procedures Used in 1944-1945 and 1976 23
  1944-1945 Testing Procedures 24
  1976 Testing Procedures. 25
  Questionnaire Surveys. 26
Description of the Instruments. 28
  The Elementary Tests 28
    1. Rate. 29
    2. Comprehension 29
    3. Directed Reading. 30
    4. Word Meaning. 30
    5. Paragraph Comprehension 30
    6. Sentence Meaning. 31
    7. Alphabetizing 31
    8. Use of an Index 32
    Total Median Score. 32
  The Advanced Tests 32
    Test 1: Rate and Comprehension 33
    Test 2: Directed Reading 34
    Test 3: Poetry Comprehension 34
    Test 4: Word Meaning 35
    Test 5: Sentence Meaning 35
    Test 6: Paragraph Comprehension. 36
    Test 7: Location of Information. 36
    Total Median Score. 37

4

PART PAGE

- Descriptions of the Samples 37
  - 1944-1945 Samples 37
    - Sixth grade sample 38
    - Tenth grade sample 38
  - 1976 Samples 39
    - Stratification 40
    - Selection 41
    - Problems that reduced the 1976 samples 43
- Processing the Data 44
  - 1944-1945 Processing 44
    - Coding 44
    - ISRT score equivalents 44
    - Presentation 45
    - Processing the questionnaire data 46
  - 1976 Processing 46
    - Scanning the answer sheets 46
    - Computer processing 47
    - Reading rate data 47
    - Total Median Score 48
    - Survey data 48
    - Reporting 49

III RESULTS 51

- Age Differences in the Samples 53
- Sixth-Grade Test Results 55
  - Unadjusted Sixth-Grade Results 56
    - Grade-equivalent norms 56
    - The comparison 57
    - T-Score comparison--sixth grade, unadjusted . . 59
  - Adjusted Sixth-Grade Results 61
    - T-Score comparison--sixth grade, adjusted . . . 64
- Tenth-Grade Test Results 68
  - Unadjusted Tenth-Grade Test Results 68
    - T-Score comparisons--tenth grade, unadjusted . 70
  - Tenth-Grade Scores Adjusted for Age Difference . . 72
    - T-Score comparison--tenth grade, adjusted . . . 76

IV CONTEXT 77

- A Contextual Interpretation 79

PART PAGE

Demographic Changes. 80
Population shifts 82
Economic Changes 83
Per capita income 83
Occupational shifts 83
School Dropout. 85
Educational Changes 88
Sixth-Grade Survey: 1944-1945 and 1976. 88
Length of school year 89
Number of elementary classrooms in the building 91
Number of sixth graders in the school 93
Number of grades in the classroom 94
Number of class minutes given daily to reading. 95
Number of class minutes given weekly to reading 97
Reading taught as a separate subject, with social studies (other content areas), or both . 98
Tenth-Grade Survey: 1944-1945 and 1976. 99

V CONCLUSIONS 101

The Indication That Students Are Reading Better Recommends Additional Research. 103
Conclusion 1: The Reading Skills Achievement of Today's Children Appears to be Higher Than That of Children from Years Past 103
Unadjusted ISRT Scores Show Little Difference in Performance. 104
Sixth grade 104
Tenth grade 105
With Adjustment for Age Differences the 1976 Students Scored Markedly Higher. 106
Sixth grade comparison--adjusted. 106
Tenth grade comparison--adjusted. 106
The Adjustment for Age Is a Valid Attempt to Equate 1944-1945 and 1976 Experience 107
Two Other Factors Need Special Consideration in Interpreting the Data 108
Dropout May Have Eliminated Many Low Achievers from the 1944-1945 Sample. 109
The Measurement Instrument May Have Been Biased to the 1944-1945 Students. 110

PART PAGE

Purpose of the ISRT. 112
Time bias. 114
Reaction of 1976 teachers to the tests 116
Conclusion 2: The Results of This Study Contradict Our National Alarm 125
Conclusion 3: The Changing Societal Context Between 1944-1945 and 1976 May Have Contributed to Changes in Educational Context That Favor the 1976 Students . . . 127
A Larger, More Affluent Population Built Bigger, Better Equipped Schools 128
Demographic changes contributed. 128
Economic changes contributed 129
Educational Context Changes Deserve Intensive Study 129
A General Analysis of Life Style Changes Could Help Focus on the Possible Impact of Phenomena Such as Television. 132
Careful Comparison Can Reveal The Route to Higher Achievement. 134
Comparison Studies Have Their Limitations 134
This Study Indicates We Have Been Headed in the Right Direction 136

REFERENCES 139

TABLE OF TABLES

TABLE PAGE

1 Grade Equivalent Comparison of Indiana Sixth Graders (1944-1945 and 1976) Based on Grade Norms for the _Iowa Silent Reading Tests_ (BM Edition)-Elementary (1943). 58

2 T-Score Comparisons of Indiana Sixth Graders (1944-1945 and 1976) for the _Iowa Silent Reading Tests_ (BM Edition)-Elementary (1943). 60

3 Comparison of Age Equivalent Performance (Years and Months) by 1944-1945 and 1976 Indiana Sixth Graders on the _Iowa Silent Reading Tests_ (BM Edition)-Elementary (1943) with Adjustment for the 10-Month Age Difference Between the Two Samples. 63

4 Comparison of T-Scores of Indiana Sixth Graders (1944-1945 and 1976) for the _Iowa Silent Reading Tests_ (BM Edition)-Elementary (1943) with Adjustment for the 10-Month Age Difference Between the Two Samples 64

5 Distribution of Total Median Scores for 1944-1945 and 1976 Indiana Sixth Graders on the _Iowa Silent Reading Tests_ (BM Edition)-Elementary (1943), Showing Number of Subjects and Percentage of Total Samples According to Years Behind or Ahead of the Grade Equivalent Norm 66

6 Percentile Comparisons of the Performance of Indiana Tenth-Grade Students in 1944-1945 and 1976 (Unadjusted) on the _Iowa Silent Reading Tests_ (BM Edition)-Advanced (1939) 69

7 T-Score Comparisons of Unadjusted Achievement of Indiana Tenth Graders (1944-1945 and 1976) on the _Iowa Silent Reading Tests_ (BM Edition)-Advanced (1939). 71

8 Percentile Comparisons of the Performance of Indiana Tenth Grade Students in 1944-1945 and 1976 (Age-Adjusted) on the _Iowa Silent Reading Tests_, (BM Edition)-Advanced (1939). 73

TABLE PAGE

9 Comparison of T-Scores of Achievement of Indiana Tenth Graders (1944-1945 and 1976) on the Iowa Silent Reading Tests (BM Edition)-Advanced (1939) with Adjustment for the 14-Month Age Difference Between the Two Samples. 76

10 Length of School Year (in Months) in Indiana for Sixth Graders in 1944-1945 and 1976. 90

11 Number of Elementary Classrooms in the Building for Indiana Sixth Grades, 1944-1945 and 1976 92

12 Number of Sixth Graders in the School for Indiana Schools in 1944-1945 and 1976. 93

13 Number of Grades in the Classroom for Indiana Sixth Grades, 1944-1945 and 1976 94

14 Number of Class Minutes Given Daily to Teaching Reading to Indiana Sixth Graders, 1944-1945 and 1976 96

15 Number of Class Minutes Given Weekly to Teaching Reading in Indiana Sixth Grades, 1944-1945 and 1976.. 97

16 Reading Taught as a Separate Subject, with Social Studies, or Both in Indiana Sixth Grades in 1944-1945 and 1976. 98

17 Length of School Year for Indiana Tenth Grades, 1944-1945. 100

18 Responses of Indiana Sixth-Grade Teachers in 1976 as to How Well the Coverage of 1943 ISRT-Elementary Relates to Their Objectives For Areas Covered on the Test 118

19 Responses of Indiana Sixth-Grade Teachers in 1976 as to the Difficulty of the 1943 ISRT-Elementary for the Average Students in Their Classes. 120

TABLE PAGE

20 Responses of Indiana Tenth-Grade Teachers in 1976 as to How Well the Coverage of the 1939 ISRT-Advanced Relates to Their Objectives for Areas Covered on the Test. 122

21 Responses of Indiana Tenth-Grade Teachers in 1976 as to the Difficulty of the 1939 ISRT-Advanced for the Average Pupil in the Class 123

TABLE OF FIGURES

FIGURES PAGE

1 Bar Representation of the Comparison of Age Equivalence Performance (Years and Months) by 1944-1945 and 1976 Indiana Sixth Graders on the Iowa Silent Reading Tests (BM Edition)-Elementary (1943) with Adjustment for the 10-Month Age Difference between the Two Samples. . . . 62

2 Line Representation of the Distribution of Total Median Scores for 1944-1945 and 1976 Indiana Sixth Graders on the Iowa Silent Reading Tests (BM Edition)-Elementary (1943) Showing Percentage of Total Samples According to Years Behind or Ahead of the Grade Equivalent Norm. 67

3 A Bar Representation of Percentile Comparison of the Performance of Indiana Tenth Grade Students in 1944-1945 and That of Their 1976 Counterparts--Unadjusted and Age-Adjusted on the Iowa Silent Reading Tests (BM Edition)-Advanced (1939). 75

Part I

INTRODUCTION

Concern over declining test scores stresses the need for studies comparing the reading achievement of children from broad geographic areas and from more widely separated time periods.

A 1944-1945 study in Indiana provided the opportunity to replicate in 1976 and to consider some of the societal and educational factors that could be relevant to the results of the comparison.

A Then and Now Study Using Broad Data from Indiana

An extensive study comparing the reading achievement of sixth and tenth graders in Indiana in 1944 and 1945 to that of Indiana children in the same grades in 1976 has shown that sixth graders in the state score about the same overall as they did 30 years ago. This is true when only grade equivalent scores are considered. The differences between the sixth grade scores for the two periods vary, depending on the subskill measured; and they favor the earlier sample by one month on Total Median Score. However, the 1944-1945 sixth grade students were found to be, on the average, 10 months older than their 1976 counterparts. When this 10-month age advantage for the 1944-1945 sample is considered, the 1976 sixth graders outscored their earlier counterparts significantly on every subskill measured and on Total Median Score.

For tenth graders, a comparison of the percentiles derived from test scores tends to favor the earlier sample very slightly, with the 1976 sample scoring higher on several subskills. The 1944-1945 tenth graders were 14 months older than the 1976 tenth graders, however; and when one draws age equivalent comparisons between the 1944-1945 and 1976 tenth grade samples, the results favor the 1976 sophomores dramatically.

Both samples for each age were tested using the same edition of the Iowa Silent Reading Tests. The 1943 Elementary ISRT were used to measure the sixth graders and the 1939 Advanced ISRT to measure the tenth graders. These editions of the Iowa tests seem more matched content-wise to the values and emphases of the earlier period, and they were administered under the limited time allotments which may have been more familiar in the experience of the 1944-1945 students.

The comparison study was conducted by the Indiana University School of Education and the Division of Reading Effectiveness of the Indiana State Department of Public Instruction. It was designed with an awareness of both the need for broadly based comparison and the problems in drawing such comparison. Surveys taken of school personnel in each period offer some revealing comparisons of setting or "context" factors which are relevant to reading education. It is recommended that the results of the study be interpreted in the cautious light of societal and educational factors that may have had a bearing on the group scores in the two periods.

The Need for Scientific Comparison

Much of what the public reads about today's schools draws loose comparisons of the achievement of contemporary students to those educated in past years. Few, if any, of such comparisons are based on broadly collected or carefully controlled data; and few make any attempt to examine the societal or educational contexts that help in understanding the performance of children. Many comparisons that gain public attention today are very general appeals to intuitive evaluation; they evoke either allegiance to yesterday's methods, materials, and classrooms or a defense of what is happening in today's schools. Unscientific comparison serves critics with a broad spectrum of motivations that range from a genuine concern for the improvement of education to the desire to effect political change. Obviously, the critics whose interest centers on improving our schools must be wary of quick, careless comparison and should seek direction from studies that attempt to be as well controlled as possible. Such studies need to be prefaced by the understanding that it is difficult to compare the achievement of today's children to that of children of former years.

A major reason that adequate comparisons have not been made is that they are difficult to effect. When data from previous years are available, the details that describe their collection, the subjects from which they were drawn, the schools that participated, and educational and societal factors that may have acted as significant variables on the specific sample are not always available. The school settings from which the samples are drawn change for many reasons: populations shift, communities develop or dwindle, schools consolidate, emphases in teacher training change, and age levels within grades change markedly.

Nor does measurement remain constant. The measurement instrument used in one era may have become unavailable, and if made available, may feature content that was more appropriate to earlier generations than to present day students. Thus if the testing instrument remains constant, its appropriateness for the populations compared must be considered. If it does not remain constant, there are other problems. Instruments that measure development and achievement change; they change to reflect shifting social values and new curricula. Thus, when scores from a contemporary instrument are laid beside those from a test of another era, content of the tests themselves must be considered as a vital factor in any differences noted.

One must compare the achievement of today's children to that of the past with a caution that considers as many of these variables as possible. Such concerns make achievement comparisons over periods of time a very complicated and imprecise business; but any responsible attempt to evaluate today's schools by comparison with an earlier period needs to examine them.

Reading as a Comparison Measure

In comparisons of yesterday's education to today's, the reading achievement of children has become a whetstone. The charge is sometimes made that children do not read as well as in the past and that schools are to blame. A consideration of social changes may provide understanding of such factors as the developing emphases in curricula and differences in the two populations compared, but there is as yet no solid objective proof that children do not read as well as they used to.

Concern over declining scores. Educators and the general public have registered great concern over the decline of scores on such tests as the Scholastic Aptitude Test (SAT) and the American College Testing Program (ACT). This concern has led to some careful analyses, such as that which grew out of the 1975

Conference on Declining Test Scores, called by the National Institute of Education (NIE) of the U.S. Department of Health, Education, and Welfare.[1] Although the decline in such tests has been widespread and marked enough to merit a serious search for all possible causes, the Conference cautioned:

> *At the present time...research cannot link the score changes on tests for the college-bound to the probable score changes for the entire school population because of sampling errors and non-random selection of students.*
>
> *(Silver, 1976, p. 23)*

This is not the only reason that it is unwise to use declining scores on college entrance exams as evidence that children at all levels are not reading as well as they used to read. It is obvious, of course, that while eleventh and twelfth graders were once second and sixth graders etc., the SAT and ACT are producing comparative scores for only eleventh and twelfth graders. Even more important is the fact that while the verbal parts of these tests do measure vocabulary and comprehension, they are not measuring basic reading ability. Moreover, the tests are designed as predictors of success in college studies and as such assess a rather high level of reading ability.

---

[1] The NIE Conference stressed the need for studying numerous factors. Meanwhile, some existing literature attempts to deal with factors in measurement, school, and/or society: See Larson _et_ _al_. (1977), Farr _et_ _al_. (1974), Weinman (n.d.), Harnishhfeger and Wiley (1975), and Wirtz _et_ _al_. (1977).

Multiple factors may help explain the decline in scores on such tests as the SAT and ACT. A recent review by a committee of the College Entrance Examination Board (Wirtz et al., 1977) examines changes in the tests themselves, in the population taking the tests, and in the educational goals that effected the change in test-taking population. The study also considers changes in school curricula and the social needs that effect those changes, the effects of television and of social upheaval, motivational factors that affect the high school senior's attitude toward the tests, etc. Among the conclusions of the Wirtz et al. review are these:

> A major part of the decline in college entrance examination scores, especially in its earlier stages, is clearly traceable to a change in the composition of the student group taking the test, resulting from the deliberate and historic decision in this country in the 1960s to extend and expand educational opportunity and to eliminate previous discrimination in according it.
>
> (Wirtz et al., 1977, p. 1)
>
> Equally clearly the score decline also reflects, particularly in the 1970s,...the

> *impact on learning of changes that have taken place in both the schools and the society during a period of turbulence and distraction rarely paralleled in American History.*
> (Wirtz et al., 1977, pp. 1-2)

If such considerations are part of a scientific approach to interpreting declines in scores on college entrance exams, they certainly recommend against using those scores to attack current reading education across the board in American schools. Writz et al. (1977) cautioned:

> *Any generalization from the SAT statistics has to be carefully qualified. It should not be extended to cover the situation of American youth as a whole or the overall effectiveness of the learning process.*
>
> *...recently published College Board Guidelines on the Uses of College Board Test Scores and Related Data warn sharply against their misuse as measures of the broader effectiveness of elementary and secondary education in general.*
> (1977, p. 5)

Increasing functional literacy. Some critics use the decline of the SAT and ACT to sound alarm that the national illiteracy rate is growing. Any careful consideration of data related to national literacy will show, however, how difficult it is to acquire meaningful data on illiteracy or data based on a consistent definition of illiteracy over a spread of years (c.f., Farr et al., 1974; Cook, 1977). And careful analysis will show that what literacy data there are indicate a continuous drop in illiteracy (or increase in functional literacy) in the United States, using various definitions that can be isolated for data from different years (Cook, 1977).

Generally, illiteracy dropped from 10.7 percent of the population 10 years or older in the United States in 1910 (6.2 million persons) to one percent (1.4 million persons) 14 years or older in 1969--according to U.S. Census data (Cook, 1977, pp. 3 and 105). The 1910 data is based on a "yes" or "no" response of U.S. citizens to a literacy question in English. The 1969 data (from the 1970 census) is based on whether an individual can read or write a simple message in any language. Such varying definitions of "literacy" accompany the figures for the decades, which nonetheless indicate a general growth of functional literacy in a country apparently concerned with its people's ability to function with language.

By 1930--after awareness created by a National Illiteracy Crusade in 1924--the number of persons over 10 years of age who could not read or write in any language was 4.3 million (4.3 percent of that population) (Cook, 1977, p. 36). The 1940 census used the age 25 and determined that 10 million (or 13.5 percent of that population) were functionally illiterate. That figure exceeded the combined adult population of California, Oregon, Washington, Idaho, Montana, Nevada, Utah, Arizona, New Mexico, Wyoming, Colorado, North Dakota, South Dakota, and Nebraska (Cook, 1977, p. 52).

Using years of schooling as a measure in 1950, 10.5 million persons 14 years and older (9.6 percent of that population in the U.S.) had less than a fifth grade education. In 1960, that figure had dropped to 8.9 million or 7 percent (Cook, 1977, p. 86). As the data for 1969 shows, the definition of literacy changed to determine that one percent of the population over 14 could not read or write a simple message in any language. The varied ways of determining literacy demonstrate the difficulty of drawing scientific, long-range comparisons with existing data.

A study by Fisher (1978) uses the existing data on illiteracy along with studies by the Educational Testing Service, Louis Harris and Associates, and the National Assessment of Educational Progress to argue that our schools "are more effective today than they have been over the last 30 to 40 years." (p. 8) Yet literacy data cannot adequately reveal whether our children read more poorly or better than did children of earlier periods or what role our schools have played in any differences found.

Other indicators. A look at studies using other general aptitude tests--some of which have sub-measures that correspond to some basic reading skills--gives a mixed indication of the reading achievement of today's students. In 1975, Flanagan (1976) gave 10 of the tests used by the 1960 project TALENT to 1,800 grade 9, 10, and 11 students. Flanagan and Jung (1971) had given one of these measures, the Reading Comprehension Test, to 13,000 grade 11 subjects in 1970. There was only a very slight gain on the subtest between 1960 and 1970; tenth graders in 1975 dropped only slightly on this subtest. There were more significant drops in the Vocabulary and English subtests, but the reported percentages for reading comprehension illustrate the problem of interpreting such data. How meaningful are very slight differences when comparing the broad sample of 1960 to the 13,000 eleventh graders in 1970 or either of those groups to 1,800 ninth, tenth, and eleventh graders in 1975?

Larsen, et al. (1976) compared college freshman reading test scores at the University of Florida for 1960 and 1970. Over the 11 years, they noted slight, but non-significant, increases in raw scores on reading rate, vocabulary, and comprehension.

In reviewing the decline in SAT scores in Massachusetts (Weinman, n.d.) discusses the fact that Preliminary Scholastic Aptitude Test scores for 1962 and 1975 show only a slight decline on the verbal section. She reports that on one-hour achievement tests in academic subjects (also administered by the College Entrance Examination Board), college-bound juniors and seniors scored five points higher on an average of the 15 tests between 1971 and 1975 (pp. 7-11). Weinman reports on eight of the specific subtests, none of which is directly applicable to reading skills.

The Iowa Tests of Basic Skills show increases on all tests for the elementary children it measures from 1940 to 1965 and a general drop after that. Median percentiles for Reading and Vocabulary subtest scores drop between 1965 and 1975. The drop ranges from between less than one percentile for fifth grade vocabulary to 4.5 percentiles for reading in grade 8. Median percentiles for grades 3 and 4 on these subtests increased slightly (Harnischfeger and Wiley, pp. 49, 50). Scores on the Minnesota Scholastic Aptitude Test (given to over 90 percent of Minnesota juniors) rose about 5.5 points from 1958 until the mid 1960's, after which they lost about half of that gain (Harnischfeger and Wiley, pp. 40, 41). The test yields one score for all aptitudes combined. The same rise to the mid 1960's with a subsequent drop is noted for the Iowa Tests of Educational Development, which measure achievement in seven areas for grades 9 through 12. Although one test measures Vocabulary, none measures any other basic reading skill (Harnischfeger, 1975, pp. 42, 43).

Generally, it can be noted that the scores of our children on various skill and aptitude tests rose until the mid 1960's and began to decline after that. But it is fruitless to arm an attack on the teaching of reading with this data without heeding its sketchy nature. Farr et al. (1974) summarize the dependability of the available data:

> *...Unfortunately, subjective appraisal of trends in achievement, reading achievement included, is often far from reliable and/or valid. At least, as a minimum condition, such judgment should be complemented by more objectively gathered data. We believe that our efforts have shown that the current data base on trends in reading achievement is extremely difficult to assess, contains many flaws which make interpretation difficult or impossible, has been irregularly maintained and hardly allows for any sure and sweeping generalizations about gains or losses across the years to be made.*
>
> *(p. 139)*

NAEP reading data. A comparison by the National Assessment of Educational Progress (NAEP) of scores on reading tests given in 1971 and again in 1975 contradicts the charge that reading achievement has dropped in recent years (NAEP Newsletter, 1976). NAEP research is carefully controlled to scientifically eliminate confounding factors, and it is the most broadly based study available. The NAEP study tested over 63,000 students, ages 9, 13, and 17, in literal comprehension, inferential comprehension, and reference skills. The NAEP 1975 results compared to those in 1971 show that the reading ability of nine year olds improved, while there was little change for 13 year olds and 17 year olds. There was improvement among 17 year olds on the most literal of the comprehension questions.

An Attempt to Draw A Broadly Based Comparison

When data related specifically to reading are used in the national debate about the reading ability of students, they tend to be based on short-term comparisons and to relate to given school districts or even to given schools. Although the NAEP data come from a national setting, they span only five years.

A question more fundamental to the concern of whether reading education is more or less effective than in the past must ask whether reading achievement has changed over a broader span of time in a broad geographic area. Objective data of this scope are needed to lend credence to any argument that the reading ability of children is decreasing or increasing. And for such data to be interpreted with any assurance of how well they evaluate today's schools, one should consider related data that attempt to define the populations compared, the social and educational settings in which they studied, and the relevance of the instrument or instruments used to the populations. It is an interesting challenge.

Replicating a broad Indiana study. In an attempt to acquire data to reveal how children's reading achievement has changed over a broad span of time in a broad geographic region, a study was conducted by the Indiana University School of Education and the Division of Reading Effectiveness of the Indiana State Department of Public Instruction. The study was designed to replicate the 1944-1945 statewide assessment of reading achievement conducted in Indiana for grades 6 and 10. The 1944-1945 assessment--also conducted by the Department of Public Instruction and Indiana University--used the Iowa Silent Reading Tests (ISRT), BM edition, (1943-1939) to sample 25 percent of the students in the state at each grade level. Subjects in 1944-1945 totaled over 15,000 sixth- and over 11,000 tenth-grade students.

The 1976 study used reprints of the same edition of the ISRT in 1944-1945. This measure was administered to a seven percent, stratified sample of over 8,000 sixth- and 8,000 tenth-grade students in Indiana schools. Thus comparable data on the total scores and on the subtest scores of the ISRT for a large population representing the entire state were made available.

Considering context factors. At the same time that the test data were interpreted, the study considered societal and educational survey data[2] to attempt to better understand any differences found in reading performance on the ISRT. These data were collected through the administration of a questionnaire to principals and teachers involved in the 1976 study. Some similar data were gathered in 1944-1945, allowing comparisons that generate some understanding of the reading performance differences noted between 1944-1945 and 1976. Such interpretation also recommends the eventual intensive analysis of all educational and societal changes to aid in interpreting the test scores.

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2. The 1976 survey data were collected by Paula Blomenberg, whose dissertation for a doctoral degree in reading at Indiana University is in progress. Blomenberg is preparing an in-depth analysis of educational and societal changes in Indiana between the periods the test was administered. The educational and societal data used in this report are from her research.

Objectives of the 1976 study. The major objectives of this comparative study were, then:

1) To compare the general reading ability of sixth and tenth grade students in Indiana in the years 1944-1945 and 1976 on the ISRT.
2) To compare the reading performances of sixth and tenth grade students in Indiana in the years 1944-1945 and 1976 on specific skills as measured by the subtests of the ISRT.
3) To consider societal and educational factors that may suggest ways to better understand any differences in reading performance noted for the two periods.

Contents of this report. The objectives of the study are treated in this report under several major headings:

- Under "Methods," the general procedures for 1944-1945 and 1976 studies are described. General descriptions of the Iowa Silent Reading Tests (BM Edition)--Elementary and Advanced--precede descriptions of the samples and an account of the data processing.
- Next, under "Results," the comparison of the test scores is presented for the sixth-grade and then the tenth grade.

- Under "Context" changes in the societal and educational environments of the subjects tested in the two periods are considered.
- The final part of the report presents several "Conclusions" with their implications. These will include a consideration of the needs of comparison studies and of the limitations of this study.

Part II

METHODS

In replicating the 1944-1945 study, the 1976 study used the exact tests used in the earlier assessment. The procedures for 1976 varied in that the tests were scored at Indiana University, additional information was sought in the accompanying survey to facilitate future analysis, and the data processing was totally computerized.

The 1976 sample was drawn on a plan for random selection within stratification to achieve the statewide proportional representation sought in the earlier study which tested 25 percent of the total state population in the sixth and tenth grades.

General Procedures Used in 1944-1945 and 1976

Both in 1944-1945 and in 1976, the study using the ISRT was conducted jointly by personnel in the Indiana State Department of Public Instruction and the School of Education of Indiana University. The close cooperation of personnel from the Department, the University, and the participating schools was necessary to administer the ISRT to large, state-wide samples and to collect survey data on the communities and schools in the studies.[3]

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[3] Information in this and other sections concerning the 1944-1945 testing is drawn from the following two reports:

Smith, Henry Lester, and Eaton, Merrill T. Analysis of the proficiency in silent reading of 15,206 sixth grade pupils in 648 schools in Indiana. Bulletin of the School of Education Indiana University, November 1945, 21(6). Published by The Bureau of Cooperative Research and Field Service, Indiana University.

Smith, Henry Lester, and Eaton, Merrill T. Analysis of the proficiency in silent reading of 11,424 sophomore pupils in 243 high schools in Indiana. Bulletin of the School of Education Indiana University, January 1945, 22(1). Published by the Bureau of Cooperative Research and Field Service, Indiana University.

1944-1945 Testing Procedures

For the 1944-1945 study, the State Superintendent of Public Instruction appointed a state testing committee of representative school people. This committee, the State Department of Public Instruction, and representatives of the Indiana University School of Education planned the study. A major aim of the 1944-1945 testing was to provide educators with "reliable information...of the level of ability of each pupil in the various skills comprising silent reading...." The Iowa Silent Reading Tests (Revised): Form BM[4] was the instrument selected--the Elementary Test for the sixth grade and the Advanced Test for the tenth grade.

The State Department of Public Instruction notified all school districts in the State, and participation was encouraged but optional. The State Department of Public Instruction initiated and guided the program. The University distributed instructions for administration of the tests, and personnel of the participating schools assumed full responsibility for the administration of the tests. The tests were scored by the school personnel in each participating school--some by hand and some by machine.

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[4] Iowa Silent Reading Tests (New Edition)-Elementary Test: Form BM (Revised). H. A. Greene and V. H. Kelley. New York: Harcourt, Brace and World, 1943.

Iowa Silent Reading Tests (New Edition)-Advanced Test: Form BM (Revised). H. A. Greene, A. N. Jorgensen, and V. H. Kelley. New York: Harcourt, Brace and World, 1939.

Sixth graders were tested over a 6-month period of the 1944-1945 school year. Summary, analysis, and interpretation of the data was done at Indiana University. Grade/month norms for the date the test was administered were determined. The tenth graders were tested "during the first semester of the school year 1944-1945." No more specific time period is given in the report of the study.

1976 Testing Procedures

To create comparable data for the 1976 study, Indiana University personnel arranged with the Psychological Corporation for the reprinting of the instrument (test booklets and answer sheets) used in 1944-1945. (See description of instrument below.) The Division of Reading Effectiveness of the Indiana State Department of Public Instruction introduced and described the study to the school systems selected for the sample. The few corporations and schools which declined to participate were replaced with comparable substitutes to balance the random sample.

Indiana Department of Public Instruction personnel handled all liaison with the schools. As in 1944-1945, the school personnel administered the tests. The sixth-grade test was administered by the classroom teacher and the tenth-grade test by the homeroom or English teacher. The testing was done during the third week of November, 1976. Unlike the 1944-1945 administration, when the tests were scored by the school personnel, test score sheets were forwarded to the University for machine scoring, compiling, and interpretation and analysis.

Questionnaire Surveys

In the 1944-1945 study, school personnel were asked to fill out a special form prepared by the University to ascertain data about the pupils, the school, and methods and aspects of teaching reading. The sixth-grade survey asked for length of the school term, number of classrooms in the building, number of grades in the room, number of minutes given each day and each week to the study of reading, class and school enrollment, and whether reading was taught as a separate subject or in connection with another subject or both. The 1944-1945 tenth grade study reported on only school enrollment and length of school year.

In the 1976 study, a questionnaire based on the form used in the 1944-1945 sixth-grade study, but also seeking additional information, was sent to all participating school personnel. It sought to ascertain the following: the type of community served by the school, the type of organization (grade breakdown) of the schools in the system, average class size, length of school year, class size (total for grade level), classes included in school, teacher training and experience in years, number of rooms in building (elementary), grouping within classroom (elementary), whether reading was taught with other subjects, information about the school's reading instructional program, varied information about the type of students taught and the community, and teacher reactions to the Iowa Silent Reading Tests. Only the data for which there is comparable data in the earlier study is reported here.[5] The teacher reactions are reported with the discussion of the appropriateness of the tests to the samples under "Conclusions," Part V of this report.

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[5] For her dissertation, Blomenberg is gathering data from the 1940's in an effort to match 1976 survey questions not asked of school personnel in 1944-1945.

Description of the Instruments

The Iowa Silent Reading Tests have been broadly used in the United States since their development to measure achievement in silent reading. The special printing of the ISRT--Elementary and Advanced--for the 1976 study were the thirty-second and twenty-fifth editions, respectively. Thus the 1976 samples took the exact tests given in 1944-1945.

The Elementary Test

The Iowa Silent Reading Tests (New Edition)-Elementary Test: Form BM (Revised) (Greene and Kelley, 1943) was used to test the sixth graders. It was developed to assess the silent reading ability of students in grades four through eight. The test emphasizes comprehension in silent reading. The manual stresses this point: "A few years ago it was enough for the child glibly to pronounce words appearing on the printed page. Now it is considered much more important for him to be able to comprehend rapidly and indicate by specific reactions his understanding of the materials." (Iowa Silent Reading Tests: New Edition: Elementary Test, Manual of Directions, 1943, p. 3)

The test is made up of a total of eight subtests plus a total score. These are 1) Rate, 2) Comprehension, 3) Directed Reading, 4) Word Meaning, 5) Paragraph Comprehension, 6) Sentence Meaning, 7) Alphabetizing, 8) Use of Index, and Total Median Score.

1. Rate. This test is the number of words a student can read in two minutes. The student reads a story for one minute, and the examiner then calls time and the examinee circles the word that was being read when time was called. The same procedure is followed for a second story. The rate score is the total number of words read in two minutes. No comprehension is measured on the Rate test.

2. Comprehension. This test is made up of 10 questions following each of the two passages in the Rate test. After the examinees have read for one minute, they are given an additional two minutes to answer the 10 questions; thus examinees are given two minutes to answer each set of 10 questions. They may not look back at the passage when they are answering the questions. This test might better be called a "rate of comprehension" test, for it is so dependent on speed. It is a test in which the comprehension is at a constant level of difficulty and hence is not a "power of comprehension" test. The directions for the test

necessitate that the examinees turn their question booklet upside down three different times.

3. Directed Reading. This test is made up of two passages, each passage accompanied by 20 questions. The examinee is instructed to locate the sentence in the passage which answers the question. The answer is chosen from four numbers corresponding to sentences in the passage. The first passage is 27 sentences long, and the second is 35 sentences long.

The test is timed; examinees are given five minutes to complete each passage. Both passages are textbook-type selections. The first deals with "Slate": how it was formed, how it is quarried, how it is used. The second deals with "Life in a Castle in Olden Times." The article describes the castle, the people who lived and worked in it, and a little about the feudal system.

4. Word Meaning. The test is made up of 55 items. Examinees are to chose from among four choices the word that means approximately the same as the stimulus word. Examinees are given nine minutes to complete the test.

5. Paragraph Comprehension. This test is made up of 10 short paragraphs (about 75 to 100 words each). Each paragraph is followed by three multiple-choice comprehension questions. Each

question has three choices. Examinees are given seven minutes to complete the test. The passages deal with the kinds of topics that are frequently found in textbooks, such as "swordfish," "silk," "corn crops," and "ducks."

6. Sentence Meaning. This test is made up of 27 questions which the examinee must answer either "yes" or "no." To answer some questions, the examinee must have background information; a few require answers based on moral judgment. The following are examples:

- Is the Fourth of July a national holiday?
- Is it necessary for the President of the United States to be a citizen?
- Is treason to one's country punishable by death?
- Does a witness always tell the truth?

Examinees have three minutes to complete the test.

7. Alphabetizing. This test is made up of 20 words and 30 pairs of guide words such as those found at the top of a page in a dictionary. Examinees are required to match each word with the pair of guide words that would appear at the top of the page on which the stimulus word would be listed. Examinees have four minutes to complete the test.

8. Use of an Index. This test is made up of several entries in an index such as might be found in a social studies textbook. Also included are 18 five-option multiple choice questions which necessitate the use of the index. Examinees are given a total of six minutes to answer the 20 questions.

Total Median Score. The raw scores for the subtests are converted into standard scores, and the median standard score for the eight subtests is the Total Median Score. It is used as a measure of average silent reading ability.

The Advanced Tests

The Iowa Silent Reading Test (New Edition)-Advanced Test: Form BM (Revised) (Greene, Jorgensen and Kelley, 1939) was designed to measure the silent reading proficiency of high school and junior college students. The test primarily includes work-study silent reading tasks that are basic to the content subjects of history, geography, science, and literature. The manual suggests that "progress in these subjects depends to a greater degree upon the ability of pupils to read rapidly and intelligently than upon any other single factor." (Iowa Silent Reading Tests: New Edition: Advanced Test: Manual of Directions, 1939, p. 1)

The test measures three broad general areas of silent reading abilities: 1) rate of reading at a controlled level of material difficulty; 2) comprehension of words, poetry, sentences, paragraphs, and longer selections; and 3) ability to use skills required to locate information. Each of these areas is covered in a number of different ways by means of 11 different types of materials arranged in seven subtests. The results are reported in nine different subtest scores plus a total score. The first and last subtests produce two scores each. The subtests are 1) Rate and Comprehension, 2) Directed Reading, 3) Poetry Comprehension, 4) Word Meaning, 5) Sentence Meaning, 6) Paragraph Comprehension, and 7) Location of Information. A total of 45 minutes of testing time are allowed to the complete test.

Test 1: Rate and Comprehension. In this test, the examinee reads two types of prose--one containing science content and the other social studies content--at a rate which, for the reader, is most comfortable for comprehension.

The examinee reads the first article for one minute and then records the number of the sentence he or she was reading at the end of that time. The examinee then reads an additional two minutes, at which time he or she turns the booklet upside down and is given an additional two minutes to respond to 10 multiple choice items. The examinee reads the second article for one minute, records the sentence number, and then reads for an additional three minutes. He or she then turns the page and has three minutes to respond to 25 true-false questions.

The rate score is the total number of sentences read in the one-minute reading of the two articles. The comprehension scores from the two selections are combined into a single score to represent one of the nine subtest scores. Test 1 thus provides two subtest scores: Rate and Comprehension, each derived from adding the scores from the two selections.

Test 2: Directed Reading. This test is designed to measure comprehension without stressing memory. The test consists of an article containing 24 numbered sentences and 20 questions. The examinee reads each question and then finds the sentence in the selection that answers that question. Three minutes are allowed for this test. The content of the selection is science, the topic glass. The score is the total number of correct responses.

Test 3: Poetry Comprehension. This test contains 20 questions relating to a part of John Keat's poem "To Autumn." The examinee is directed to read the poem very carefully before attempting to answer any of the questions about it. The answers are selected from numbered and bracketed phrases in the poem. Five minutes are allowed for this test. The score is the total number of questions answered correctly.

Test 4: Word Meaning. This test has been designed to measure understanding of words which often appear in materials used in the four major academic subjects: social science, science, mathematics, and English. The items consist of a statement which is correctly completed by one of five numbered words or phrases. The 70 items include 20 social science, 15 science, 15 math, and 20 English terms. Each part of the test has a time limit. Two minutes are allowed for the social science and English parts and one and a half minutes for the science and math sections. The numbers correct from each part are combined into a single score for this test.

Test 5: Sentence Meaning. This test contains 50 questions which the examinee answers as either "yes" or "no." The words in the sentence questions were from graded word lists. The "social frequency" of the terms used and of the content were also checked because the sentences assume that the reader has background information and a particular set of values. For example, two questions read: "Does allegiance to one's country imply loyalty?" "Are desirable laws often hard to enforce?" Four minutes are allowed for this test. The score is the number of correct minus incorrect responses.

Test 6: Paragraph Comprehension. This test includes two specific aspects of paragraph comprehension: 1) the ability to select the central topic of the paragraph and 2) the ability to identify details essential to the meaning of the paragraph. Each of the 12 paragraphs is accompanied by three multiple-choice questions. The first question pertains to the central topic and the second and third pertain to essential details. For diagnostic purposes, the pattern of answers to the different type of questions can be analyzed. The norms for the test are based upon the total number of correct responses. Nine minutes are allowed for this test.

Test 7: Location of Information. This test consists of two parts. Part A, Use of the Index, contains 15 multiple-choice items relating to a short index contained in the test. Part B, Selection of Key Words, consists of 20 items. Each item includes a question followed by four key words. The examinee is to select the one that would not help locate information on that question. For example, one question and its option words reads:

What is the annual cost of damage done to crops
by insects?
1) insects 2) boll weevil 3) wool 4) crops

Separate norms are provided for each part. The score for each is the total number correct. Three minutes are allowed for each part of the test.

Total Median Score. The raw scores for each of the nine subtests are converted into standard scores. Tables are provided to convert the standard scores into grade percentile rank for grades 9 through 12. The median standard score of the nine subtests is the Total Median Score. Tables are provided to convert the Total Median Score to percentiles for each grade.

Descriptions of the Samples

The 1944-1945 study represented the population for the whole state with a large sample, while the 1976 study controlled its sample with stratification.

1944-1945 Samples

Elementary and high schools participating in the 1944-1945 study volunteered after the project was introduced by the

Indiana State Department of Public Instruction. Although this did not allow for control of the number of schools of a particular size, type, or locality, the researchers at the time concluded that the samples were representative because they were 25 percent of the total population in each of the two grades and because the participating schools at each level were widely spread geographically over the state.

At each level, the participating schools were classified as either 1) "township," 2) "city," or 3) "special." The latter included "parochial, special, town, state laboratory, joint township, consolidated town and township, and joint town and township schools." No rationale for the classification distinction between "township" and some of the similar descriptions in the "special" category was reported.

Sixth grade sample. A total of 15,206 sixth graders from 648 elementary schools took part in the 1944-1945 testing. The schools included 388 township, 213 city, and 47 special schools. The number of sixth graders from each type were 5,799 township (38 percent of the sample); 8,313 city (55 percent of the sample); and 1,094 special (7 percent of the sample).

Tenth grade sample. A total of 11,424 sophomores from 243 high schools took part in the 1944-1945 testing. Of these, 3,257 (28 percent of the sample) were from 153 township schools; 7,232 (63 percent of the sample) were from 66 city schools; and 935 (9 percent of the sample) were from 24 special schools.

1976 Samples

About 8,000[6] sixth graders from 117 schools and about 7,000[6] tenth graders from 31 schools were tested in 1976. This represented approximately an 8 percent sample of the sixth grade and a 6 percent sample of the tenth grade population of the state. Consolidation and other factors made it impossible to draw the 1976 sample from any plan based on the specific participating schools in the 1944-1945 study. Therefore, it was decided to draw a sample stratified to guarantee a representative sample for the 1976 study.[7]

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[6] These figures are approximate here because the numbers vary from subtest to subtest and on Total Median Score. This is so because not all subjects took all the subtests. All the scores for each subtest were averaged into the 1976 sixth and tenth grade means for that subtest. Only scores from subjects who completed all the subtests, however, were used in determining the Total Median Scores for the two grades.

[7] John Hesemann of the Indiana Department of Public Instruction designed the sampling plan described in the following section.

Stratification. The samples were stratified on two variables--the region of the state and the type of community comprising the population center of the school corporation. Regions of the state were classified as follows:

1) North--approximately the area north of U.S. Route 40 excepting classification 2 and 3 below
2) Northwest--Lake, Porter, and LaPorte counties
3) Indianapolis area--Marion, Boone, Hamilton, Hendricks, Morgan, Johnson, Shelby, and Hancock counties
4) South--balance of the state

The communities were classified as one of the following five types, using the population figure of the area where the school corporation is centered:

1) Urban--school corporations with population centers exceeding 50,000 persons
2) Rural--school corporations with population centers of less than 10,000 persons
3) Large Town--school corporations with population centers of between 10,000 and 20,000
4) Small City--school corporations with population centers of between 20,000 and 50,000

5) Suburban--school corporation contiguous with those classified in type 1 above

The two stratifications created 20 cells (4 types by locality x 5 types of communities), and the total population figures for each cell were determined for sixth graders and for tenth graders. A previous study had classified each of Indiana's 305 school corporations according to the two variables and had selected a sample of 79 corporations proportionately representative of the corporations in the state according to their enrollment size.

Selection. For convenience and uniformity of testing, it was decided that all the sixth or tenth graders in the schools selected from the pool of 79 school corporations would be tested. The schools were chosen separately for each grade level and at random, using tables of random digits, until the desired number of subjects was reached for a particular cell. For example, in the Large Town-North cell, there was a total population of 2,702 sixth graders in 27 schools. Schools were selected at random until the 8 percent figure was exceeded. For this cell, 5 schools were selected. To reach the 7 percent sample for tenth graders in the same cell, it was necessary to select only one school, for the first drawn had 638 tenth grade students.

Several exceptions to the above procedure became necessary:

1) Two corporations randomly selected declined to participate. One was in the Rural-Indianapolis cell, in which there remained enough preselected schools in the pool to fill out the sample by random selection. The other was the larger of two corporations in the Urban-Northwest cell. Since removal of schools in this corporation significantly reduced the pool of schools available in this cell, another corporation (not in the originally selected 79) was added to the pool and replacement schools selected at random from it.
2) Two elementary schools in the Urban-North cell and one high school in the Suburban-Indianapolis cell declined to participate because of other recent testing activity. The elementary schools were replaced by a school recommended by the corporation, and the high school was replaced by another selected at random from the pool of available schools.
3) An elementary school in the Urban-Northwest cell and one in the Rural-Indianapolis cell no longer existed. In both cases they were replaced by the new schools whose

sixth graders included those formerly attending the schools which had been closed.

Problems that reduced the 1976 samples. From the original number of subjects tested, different numbers of subjects were lost on the various subtests. This was true because all children did not take all the subtests. When a subject did not have a score for each subtest, the scores he or she did have were figured in the mean for those subtests; but that subject's scores were not figured in the average Total Median Score. There were a sizeable number of sixth grade subjects without Rate scores, and when this difficulty was added to those subjects with Rate scores but missing another subtest score, the number of sixth graders whose scores contributed to the Mean Total Median Score was reduced by about 1,600. This reduction was much larger than that of any single subtest or of any of the tenth grade scores.

In addition, an unexplained phenomenon developed in computer processing that resulted in unusable data for less than a hundred of the 8,000 sixth-grade subjects. Since it was possible that the problem was traceable to the scanning of the answer sheets and would have required rescanning and reprocessing of all the data and since a spot check indicated these subjects were distributed throughout the cell matrix, they were eliminated from the study. The computer problem experienced with data could not have happened in 1944-1945, but since that study dealt with over three times as many subjects, it is highly probable that the problem of subjects for whom there were missing subtest or rate scores occurred.

Processing the Data

The data for 1944-1945 were processed on Hollerith cards. No specific data processing equipment is mentioned, but card sorting and counting machines were probably used. The 1976 data was processed on a CDC 6600.

1944-1945 Processing

Coding. In 1945, the graded answer sheets were sent by the schools to the Indiana University School of Education, where they were inspected. Schools were consulted about any missing or questionable information and the data were coded and punched on Hollerith cards, which were processed.

ISRT score equivalents. The raw scores of the sixth grade data were translated into standard scores and then to corresponding grade equivalents. The standard score and corresponding grade equivalent for the entire tests were determined by computing the Total Median Score of the eight separate tests. It was necessary in making these translations to consider and make an adjustment for the particular month in which the subject took the test in relation to the month in which his or her sixth year of schooling began.

The sophomore data consisted of nine subtests with a raw score to be translated into a standard score and then into a corresponding percentile for each subtest. The standard score and corresponding percentile for each subject on the total test was determined by computing the median standard score for the nine separate tests.

Presentation. The processed data were tabulated by school and organized by type of school, but the schools were identified by a code number only. Each school also received the results of its individual students with corresponding grade equivalents (sixth grade) or centiles (tenth grade) and quartile distribution for the subtests and for the total test. Knowing its code number, a school could also see how the average performance of its pupils compared to that of the pupils from each of the three types of schools.

For example, the sixth grade schools got the data on individual students as well as the following data for the total test on the schools by type: number of pupils in the school, mean standard score, corresponding grade equivalent, deviation from grade equivalent norm, and distribution of pupils around the norm. For each subtest, schools got each other's Mean Standard Score, corresponding grade equivalent, and deviation from the norm. The reports of the study offered detailed sample interpretations of the data to show the schools how to use the results for their own analyses, needs, and instructional action. Complete publication of the 1944-1945 data was prohibited by war shortages.

Processing the questionnaire data. The extra data collected on special forms filled out by the participating school personnel in the 1944-1945 study were compiled and analyzed by University personnel for summary in the report.

1976 Processing

Scanning the answer sheets. The answer sheets on which the subjects marked their answers were machine-scannable. These were scanned in stacks, so that all the front sides of the sheets in a stack were scanned first and then all the back sides for that stack were scanned. The scanned data were recorded on punched computer cards. The data for each side of the sheet include an identification number for the subject, and this information allowed the subsequent matching of the data from the two sides of each subject's answer sheet. The data on reading rate were not scannable and had to be key-punched at a later stage.

Computer processing. The data from the punched cards were processed using a series of computer programs written especially for the 1976 project. After the data from the two sides of each subject's answer sheet were matched, it was necessary to reorder it so that the answers would appear in the same sequence as the test items. Next, a scoring program checked each answer for correctness to produce a raw score for each subtest. A fourth program converted the raw scores to standard scores according to the tables in the test manual. Data for sixth graders had to be translated to grade equivalents, and that for tenth graders to percentiles. The sixth-grade data were then aggregated on a school-by-school basis.

Reading rate data. The data on reading rates had to be keypunched from handwritten responses on the answer sheets. The standard scores were figured by hand on the individual sheets, and then the subject's identification number and standard score were keypunched. The cards resulting from this operation were matched with the data already in the computer, and the raw scores were appended to the other subtest scores.

Total Median Score. With all eight standard scores available for the sixth-grade subjects, a program was used to find the middle two and to average them, producing the Total Median Score. For the tenth grade, the Total Median Score was the middle of the nine standard scores. The Total Median Score was appended to each individual record. These records, then, consisted of the identification number, seven standard test scores for the sixth graders and eight for the tenth graders, the Total Median Score, and a Rate score; and they were used as the data for subsequent statistical analysis.

Survey data. Data was compiled from the questionnaires sent to the participating principals and teachers in the 1976 study. Of the 117 elementary schools, 47 returned a single representative questionnaire and 70 sent multiple questionnaires. The number of sixth grade teachers completing the questionnaire at these 70 schools ranged from 20 to 9. A total of 251 questionnaires were returned from the elementary schools.

From the 31 high schools taking part in the study, 108 questionnaires were returned. A single questionnaire was returned from each of 21 schools, and 87 came from 10 of the high schools.

In compiling data dealing with teachers or with teachers' opinions, all of the 251 elementary and 108 high school questionnaires were used. Certain items on the questionnaire sought information about the community and the school, and in compiling this data, one questionnaire was selected from each of the schools returning multiple questionnaires.

Reporting. This publication is the full initial report of this data processing. Since the study was designed as a then and now comparison, its purpose was quite different from the 1944-1945 study, which was aimed at giving the schools information that might determine instructional decisions. It was agreed from the outset that no individual school data would be returned to the schools in the 1976 study.

Part III

RESULTS

A grade equivalent comparison of the reading performance of the 1944-1945 Indiana sixth graders with those in 1976 shows little overall difference. With an adjustment for a 10-month age difference, however, the 1976 sample outscored their earlier counterparts on every subtest and on Total Median Score.

Unadjusted percentile averages for the Indiana tenth graders show a very slight advantage for the 1944-1945 sample. An adjustment for a 14-month age difference, however, indicates a dramatic improvement for the 1976 sophomores.

Age Differences in the Samples

The educational and societal factors to be considered in Part IV of this report suggest some interesting reasons for any differences that one might find in the reading achievement of children between 1944-1945 and 1976. One of these factors, however, is so important to the interpretation of the test data for both grades that it needs to be introduced at the outset of the presentation of the results of this comparative study. An analysis of the Census Bureau reports for 1940 and 1970[8] reveals that the average age of Indiana sixth graders at the time of the census in 1940 was 12 years and 4 months. In the 1970 census, the average age of Indiana sixth graders had fallen to 11 years and 6 months. It would be interesting to study the reasons for this 10-month decrease in average age.

It is known that retention was practiced in the schools in the 1940's much more than in the schools of the 1970's. As we shall see, by the time children in 1940 reached the tenth grade, they were an average of 14 months older than their 1976 counterparts, indicating that the impact of retention on the age of students increases at the higher grade levels. If retention is accepted as a major explanation of the age difference, one might argue that the 10-month advantage of the 1944-1945 sixth-grade sample represents, to some degree, more time in school or "school experience." Based on the 10-month difference in the average age of Indiana sixth graders in 1940 and in 1970, a new analysis for comparison seemed appropriate in this study. In this comparison, an age equivalent is determined for 1944-1945 and for 1976.

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[8] Census of the United States. U.S. Census Bureau: U.S. Government Printing Office, Washington, D.C., 1940 and 1970.

Census data from 1940 and 1970 show a 14-month age difference between 1940 Indiana tenth graders and 1970 Indiana tenth graders. It will be discussed in the presentation of the test data for the tenth grade. Tenth grade test data will be presented first as percentiles without adjustment and then as adjusted by using the percentiles for their school age group.

Because of the procedure necessary to arrive at age-equivalent comparisons for the two grades, the resulting age-equivalent scores for both sixth and tenth grades are referred to throughout this report as "adjusted" or "age-adjusted" scores.

They are, however, as reasonable a perspective on reading achievement as are grade equivalents.

In considering reading performance, it is as valid to norm by age as it is to norm by grade level equivalent. In fact, the 1943 elementary test manual makes this point by presenting both equivalents in its table for converting standard scores. In his 1961 study, Gates relied solely on age-equivalent comparisons that adjusted the reading scores of the children tested in 1947 before they were compared to those tested in 1937. Finch and Gillenwater considered chronological age differences in a 1949 study comparing the reading performance of 1931 sixth graders to those in 1949. The National Assessment of Educational Progress is designed to compare age equivalent groups over time.

Sixth-Grade Test Results

Comparison of the results from the sixth-grade testing for 1944-1945 and 1976 reveals that reading achievement at this level is about the same when the age difference is not considered. With adjustment for the age factor, the 1976 sample outscored their 1944-1945 counterparts on all subtests and on Total Median Score.

Unadjusted Sixth-Grade Results

Grade-equivalent norms. The 1944-1945 study reports its sixth-grade results as grade equivalents to norms given in the 1943 ISRT Manual of Directions. These are arrived at by deriving standard scores from raw scores on the eight subtests, by determining the Total Median Score, and by converting these nine scores into grade equivalents using a conversion table. Thus when this 1976 comparison refers to months above or below the norm, it means that the average score of the sample referred to is the score the 1943 test manual gives as the norm for that grade plus or minus that number of months. For example, the 1944-1945 sample is one month above the norm on the Directed Reading subtest and the 1976 sample is two months above. Thus the grade equivalent scores for 1976 sixth graders on this subtest averaged one month above the average score for the 1944-1945 students.

The test norms are based on a 10-month school year, and the grade equivalent scores based on these norms are expressed in whole numbers (for years) and decimals (for months). For example, 6.4 would mean four months into sixth grade.

The comparison. Before making the 10-month adjustment for the 1976 students, the grade equivalent comparison shows that the 1944-1945 sixth grade students scored at the grade norm on two subtests: Sentence Meaning and Use of Index; below the grade norm on four: Rate, Comprehension, Word Meaning, and Paragraph Comprehension; and above the grade norm on two: Directed Reading and Alphabetizing. (See Table 1.) The 1976 sixth graders scored at the grade norm on two subtests: Word Meaning and Sentence Meaning; below the grade norm on three: Rate, Comprehension, and Paragraph Comprehension; and above the grade norm on three: Directed Reading, Alphabetizing, and Use of Index. The 1944-1945 sixth graders scored at the grade norm on Total Median Score, while the 1976 subjects scored -.1 (or one month) below the grade norm before the 10-month age difference is considered.

The 1944-1945 sixth graders outscored their 1976 counterparts on two subtests: Rate and Paragraph Comprehension; but the 1976 sixth grade subjects scored higher than the 1944-1945 sample on four subtests: Directed Reading, Word Meaning, Alphabetizing, and Use of Index. The samples from the two periods scored the same on the subtests on Comprehension and Sentence Meaning when no adjustment for the 10-month difference in age is made.

Table 1

Grade Equivalent Comparison of Indiana Sixth Graders (1944-1945 and 1976) Based on Grade Norms for the Iowa Silent Reading Tests (BM Edition)-Elementary (1943)

Test	Months Above or Below Norm*-1944	Months Above or Below Norm*-1976	Change from 1944 to 1976 (+ or -)
1. Rate	- .4	- .6	- .2
2. Comprehension	- .5	- .5	0
3. Directed Reading	+ .1	+ .2	+ .1
4. Word Meaning	- .2	0	+ .2
5. Paragraph Comprehension	- .2	- .6	- .4
6. Sentence Meaning	0	0	0
7. Alphabetizing	+ .4	+1.2	+ .8
8. Use of Index	0	+ .4	+ .4
Total Median Score	0	- .1	- .1

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* For both the 1944-1945 and 1976 students, the Norm Comparisons are grade equivalents provided in the Iowa Silent Reading Test: Manual of Directions (1943).

On the basis of the normed distributions and the standard error of measurement of the test, it was decided for the purposes of this study that differences by months of grade equivalence are not significnat educationally unless they are of three months or more. For the unadjusted sixth-grade scores, the four-month drop in Paragraph Comprehension between 1944-1945 and 1976, the eight-month gain in Alphabetizing, and the four-month gain on Use of Index between the two periods are here considered educationally significant.

T-Score comparison--sixth grade, unadjusted. In addition to the grade equivalent comparison in Table 1, the standard scores for the 1944-45 population and the 1976 population were converted to T scores. (See Table 2.) This conversion was done by using the mean and the standard deviation of the standard scores for each subtest. While the comparison of T scores is basically the same as the grade equivalent comparisons, the T-score comparison takes into account the different distributions of the scores for each of the subtests. In addition, the T-score comparisons tend to minimize small differences, which are probably of less significance anyway. This T-score comparison allows the reader to examine both grade equivalent and standard score (T-Score) comparisons.

Table 2

T-Score* Comparisons of Indiana Sixth Graders (1944-1945 and 1976) for the Iowa Silent Reading Tests (BM Edition)-Elementary (1943)

Test	Mean T-Score Achieved by 1944-45 Students	Mean T-Score Achieved by 1976 Students	Difference 1944 Minus 1976 T-Scores
1. Rate	47.4	46.9	- .5
2. Comprehension	45.3	45.3	0
3. Directed Reading	47.7	48.2	+ .5
4. Word Meaning	45.1	46.3	+ 1.2
5. Paragraph Comprehension	46.9	45.2	- 1.7
6. Sentence Meaning	47.2	47.2	0
7. Alphabetizing	49.9	52.4	+ 2.5
8. Use of Index	47.0	48.8	+ 1.8
Total Median Score	46.2	45.4	- .8

*T-Scores have a mean of 50 and a standard deviation of 10.

Adjusted Sixth-Grade Results

Considering the 10-month difference in age, the performance of the 1976 Indiana sixth graders exceeded that of their 1944-1945 counterparts on every test. To make this comparison, the age equivalents for the grade equivalents are taken from the test manual conversion table for the two periods; then the age adjustment is made in the 1976 scores. Since the average age of Indiana sixth graders at the time of the 1940 census was 12 years and 4 months and the average age of Indiana sixth graders at the time of the 1976 census was 11 years and 6 months, the adjusted age equivalent adds 10 months to the performance of the 1976 population because they are 10 months younger than were their 1944-1945 counterparts.

With the adjustment, the 1976 sample outscored the 1944-1945 sample significantly on every test, ranging from six months on Paragraph Comprehension to one year and eight months on Alphabetizing. With the adjustment, the 1976 gain on the Total Median Score is eight months. (See Table 3.)

The data in Tables 2 and 3 are translated into bar representation in Figure 1.

Figure 1

Bar Representation of the Comparison of Age Equivalence Performance (Years and Months) by 1944-1945 and 1976 Indiana Sixth Graders on the Iowa Silent Reading Tests (BM Edition)-Elementary (1943) with Adjustment for the 10-Month Age Difference Between the Two Samples

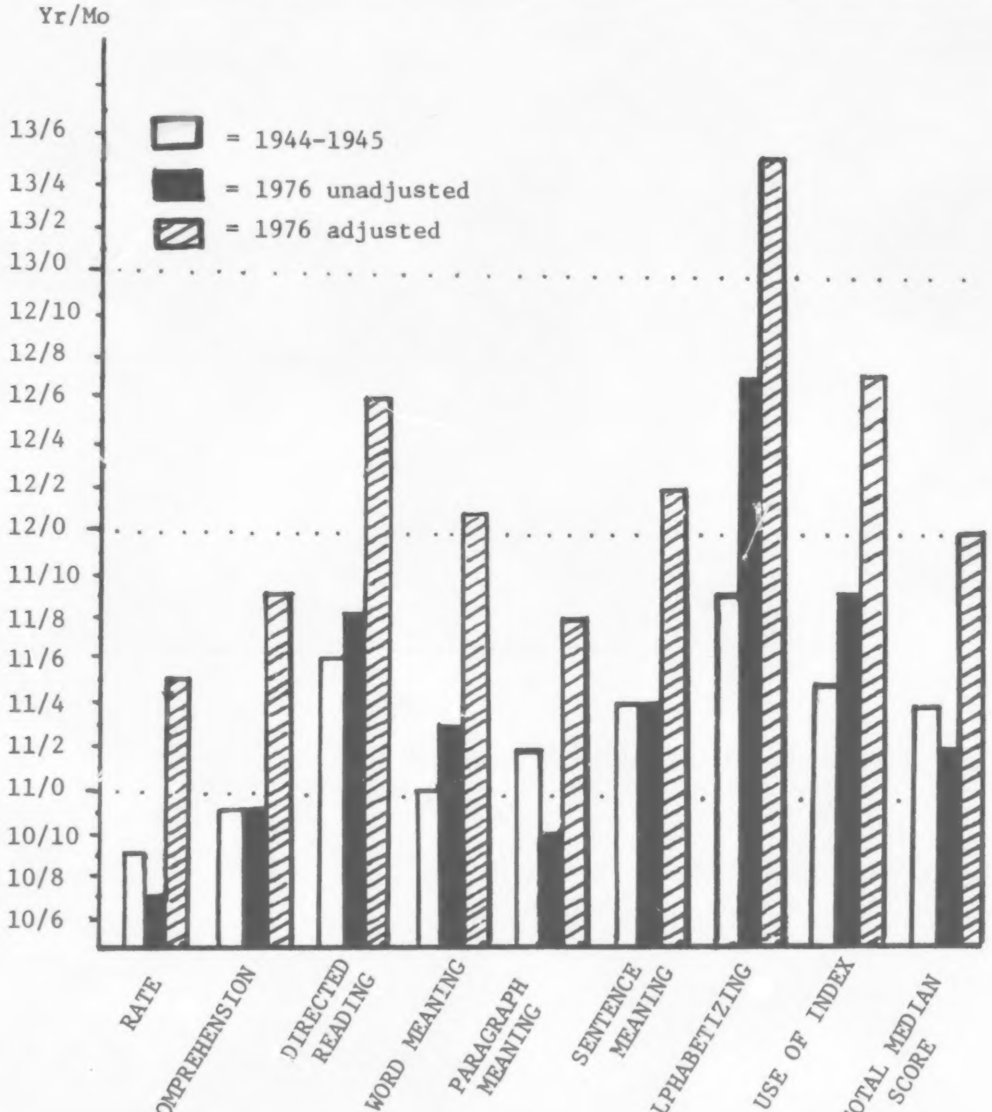

Table 3

Comparison of Age Equivalent Performance (Years and Months) by 1944-1945 and 1976 Indiana Sixth Graders on the Iowa Silent Reading Tests (BM Edition)-Elementary (1943) with Adjustment for the 10-Month Age Difference Between the Two Samples

	Age Equivalent Performance: Years-Months			
Test	1944*	1976 Unadjusted*	1976 Adjusted**	Change from 1944 to 1976
Rate	10-9	10-7	11-5	+ 0-8
Comprehension	10-11	10-11	11-9	+ 0-10
Directed Reading	11-6	11-8	12-6	+ 1-0
Word Meaning	11-0	11-3	12-1	+ 1-1
Paragraph Comprehension	11-2	10-10	11-8	+ 0-6
Sentence Meaning	11-4	11-4	12-2	+ 0-10
Alphabetizing	11-9	12-7	13-5	+ 1-8
Use of Index	11-5	11-9	12-7	+ 1-2
Total Median Score	11-4	11-2	12-0	+ 0-8

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* Determined from conversion table in the test manual.

** Since the 1976 sample 10 months younger than the 1944-1945 sample, the adjustment adds 10 months to the 1976 Age Equivalent Performance.

T-Score comparison--sixth grade, adjusted. As with the unadjusted sixth grade results, the mean standard scores were converted to T-Scores and compared. (See Table 4.) These T-Score comparisons are basically the same as the results with the age-equivalent comparisons in Table 3. However, small differences are minimized with T-Score comparisons.

Table 4

Comparison of T-Scores of Indiana Sixth Graders (1944-1945 and 1976) for the *Iowa Silent Reading Tests* (BM Edition)-Elementary (1943) with Adjustment for the 10-Month Age Difference Between the Two Samples

Test	Mean T-Score Achieved by 1944-45 Students	Mean T-Score Achieved by 1976 Students With Age Adjustment	Difference 1944 Minus 1976 T-Scores
1. Rate	47.4	48.9	+ 1.5
2. Comprehension	45.3	48.8	+ 3.5
3. Directed Reading	47.3	52.3	+ 5.0
4. Word Meaning	45.1	50.6	+ 5.5
5. Paragraph Comprehension	46.9	48.9	+ 2.0
6. Sentence Meaning	47.2	51.1	+ 3.9
7. Alphabetizing	49.9	54.2	+ 4.3
8. Use of Index	47.0	52.9	+ 5.9
Total Median Score	46.2	50.0	+ 3.8

Table 5 breaks down the Total Median Score for the samples from both periods according to the number and percentage of subjects who scored at the sixth grade level or one, two, or three years behind or ahead of that level. The breakdown for the 1976 sixth graders is refigured after their scores are adjusted for the 10-month age difference. Since the grade equivalent norms for the test are represented as 10-month school years, each column in Table 5 represents a 10-month spread around the grade equivalent norm. Figure 2 translates percentage data in Table 5 into line representation.

The difference in comparing sixth grade scores with and without the adjustment for the age difference is clearly demonstrated in Figures 1 and 2. In Figure 2, the distribution curves for 1944-1945 and for 1976 are strikingly similar before the age difference is considered. After adjusting the 1976 scores, the curve for the 1976 sixth graders moves dramatically toward the higher end of the achievement spread.

Table 5

Distribution of Total Median Scores for 1944-1945 and 1976 Indiana Sixth Graders on the Iowa Silent Reading Tests (BM Edition)-Elementary (1943), Showing Number of Subjects and Percentage of Total Samples According to Years Behind or Ahead of the Grade Equivalent Norm

		Years Behind or Ahead of Norm*						
		-3	-2	-1	Norm	+1	+2	+3
1944-1945	#	707	2069	3727	3219	2498	1440	1546
	%	4.6	13.6	24.5	21.2	16.4	9.5	10.2
1976 Unadjusted	#	209	885	1626	1306	1124	571	510
	%	3.4	14.2	26.1	21.0	18.0	9.2	8.2
1976-Age Adjusted**	#	54	405	1086	1383	1731	816	780
	%	0.9	6.5	17.1	22.2	27.8	13.1	12.5

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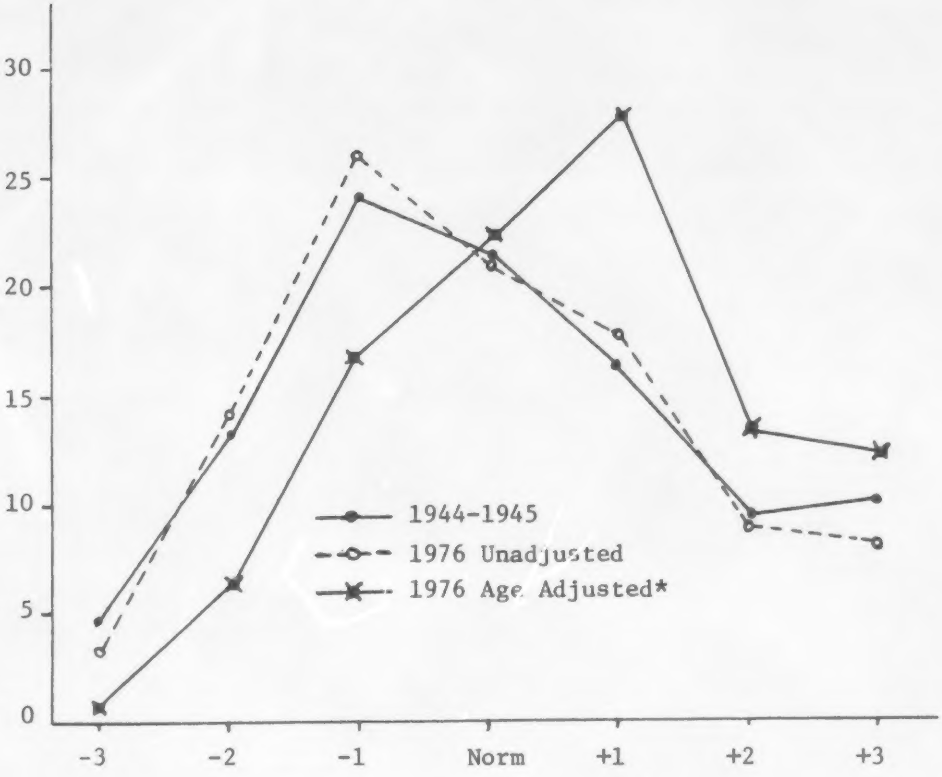
* The range for each column is 10 months.

** Since the 1976 sixth graders were, on an average, 10 months younger than the 1944-1945 sixth graders, the adjusted data adds 10 months to their Total Median Scores.

Figure 2

Line Representation of the Distribution of Total Median Scores for 1944-1945 and 1976 Indiana Sixth Graders on the Iowa Silent Reading Test (BM Edition)-Elementary (1943), Showing Percentage of Total Samples According to Years Behind or Ahead of the Grade Equivalent Norm.



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* Since the 1976 sixth graders were, on an average, 10 months younger than the 1944-1945 sixth graders, the adjusted data adds 10 months to their Total Median Score.

Tenth-Grade Test Results

Without adjustment for the age difference, comparison of scores for the 1944-1945 and 1976 tenth graders shows that overall performance is basically unchanged; but when the 14-month difference in ages is taken into account, the 1976 sophomores score far above their 1944-1945 counterparts.

The advanced Iowa Silent Reading Tests (1939) uses percentiles rather than grade equivalents for norm interpretations. This means, for example, if a student scored at the 49th percentile, he or she scored equal to or better than 49 percent of the children of that grade on whom the test had been normed. A percentile score of 49 also means that 51 percent of the norm population scored higher than this particular student.

Unadjusted Tenth-Grade Test Results

When the age difference is ignored (See Table 6), the 1944-1945 tenth graders scored at higher percentiles than did the 1976 sample on five of the nine subtests: Comprehension, Poetry Comprehension, Word Meaning, Sentence Meaning, and Paragraph Comprehension. The 1976 sample scored higher on four subtests: Rate, Directed Reading, Use of Index, and Selection of Key Words. Total Median Score was down 2 percentile points in 1976.

Table 6

Percentile Comparisons of the Performance of Indiana Tenth-Grade Students in 1944-1945 and 1976 (Unadjusted) on the Iowa Silent Reading Tests (BM Edition)-Advanced (1939)

Test	Percentile Ranking 1944*	Percentile Ranking 1976*	Change from 1944-1976 (+ or -)
1. Rate	45	51	+ 6
2. Comprehension	38	35	- 3
3. Directed Reading	37	41	+ 4
4. Poetry Comprehension	44	41	- 3
5. Word Meaning	41	39	- 2
6. Sentence Meaning	47	37	-10
7. Paragraph Comprehension	41	33	- 8
8. Use of Index	42	49	+ 7
9. Selection of Key Words	45	47	+ 2
Total Median Score	42	40	- 2

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* For both the 1944 and 1976 students, the Norm comparisons are those provided in the Iowa Silent Reading Tests-Advanced Test: Manual of Directions (1939).

On the basis of the normed distributions and the standard error of measurement of the test, it was arbitrarily decided for this study to consider a percentile difference of three points as significant. With this point of view, (again ignoring the age difference) the following subtest scores are of special interest: Rate was up 6 percentiles in 1976; Comprehension and Poetry Comprehension were down 3 percentiles; and Directed Reading was up 4 percentiles. The largest changes were in Sentence Meaning, down 10 percentiles; Paragraph Comprehension, down 8 percentiles; and Use of Index, up 7 percentiles.

T-Score comparisons--tenth grade, unadjusted. As with the sixth grade results, the mean standard score for each subtest was converted to a T-Score. (See Table 7.) This conversion was done by using the mean and the standard deviation of the standard scores for each subtest. While this comparison of T-Scores is basically the same as the percentile differences, the T-Score comparison takes into account the different distributions of the scores for each of the subtests. In addition, the T-Score comparisons tend to minimize small differences, which are probably of less significance anyway. This T-Score comparison allows the reader to examine both grade equivalent and standard score (T-Score) comparisons.

Table 7

T-Score* Comparisons of Unadjusted Achievement of Indiana Tenth Graders (1944-45 and 1976) on the Iowa Silent Reading Tests (BM Edition)-Advanced (1939)

Test	Mean T-Score Achieved by 1944-1945 Students	Mean T-Score Achieved by 1976 Students	Difference 1944-45 Minus 1976 T-Scores
1. Rate	49.1	50.4	+ 1.3
2. Comprehension	47.3	46.5	- .8
3. Directed Reading	46.7	47.8	+ 1.1
4. Poetry Comprehension	48.6	47.6	- 1.0
5. Word Meaning	47.3	46.8	- .5
6. Sentence Meaning	45.8	43.2	- 2.6
7. Paragraph Comprehension	47.4	45.3	- 2.1
8. Use of Index	47.5	50.0	+ 2.5
9. Selection of Key Words	48.9	49.5	+ .6
Total Median Score	48.0	47.4	- .6

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* T-Scores have a mean of 50 and a standard deviation of 10.

Tenth-Grade Scores Adjusted for Age Difference

The 1940 and 1970 U.S. Census Bureau figures show that Indiana high school sophomores in the earlier period were, on an average, 14 months older than they were in 1970. Tenth graders' average age was 16 years, 7 months old in 1940 and 15 years, 5 months in 1970. This decrease in average age seems to be a logical extension of the age difference found for sixth graders for the same periods. While the difference at sixth grade was 10 months, it is reasonable to assume that if promotion policies in the late 1930's and early 140's tended to retain more students, the age differences would increase with grade levels.

In order to adjust the tenth grade scores for age difference, norm percentiles for ninth graders were used instead of those for tenth graders. Thus in this comparison, the scores for the 1976 tenth graders are based on norm groups that are about equal to the average age of 1976 students. Table 8 shows the marked improvement for the 1976 sophomores over their 1944-1945 counterparts on all the subtests except Sentence Meaning and Paragraph Comprehension, on which they scored one percentile higher and the same, respectively. Age-adjusted, the Total Median Score of the 1976 sample is up 10 percentile rank points. It is interesting to note that, with the adjustment, the 1976 sample scored above the 50th percentile on five of the nine subtests and on the Total Median Score. This means that age considered, they performed better in these areas than a majority of the readers on whom the test had been originally normed. The data in Tables 7 and 9 are combined in Figure 3.

Table 8

Percentile Comparisons of the Performance of Indiana Tenth Grade Students in 1944-1945 and 1976 (Age-Adjusted) on the Iowa Silent Reading Tests, (BM Edition)-Advanced (1939)

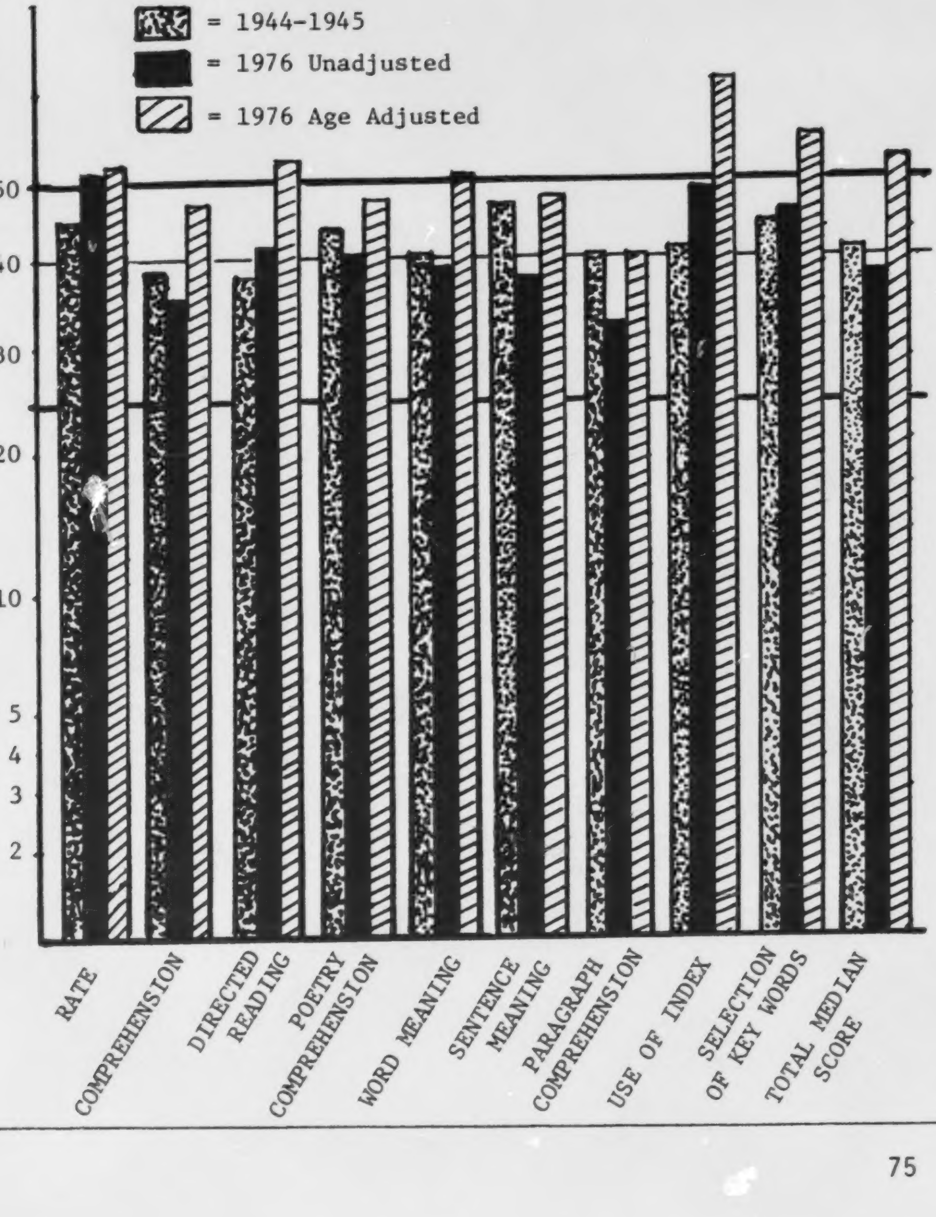
Tests	Percentile Ranking 1944	Percentile Ranking 1976*	Change from 1944 to 1976
Rate	45	52	+ 7
Comprehension	38	47	+ 9
Directed Reading	37	52	+ 15
Poetry Comprehension	44	48	+ 4
Word Meaning	41	51	+ 10
Sentence Meaning	47	48	+ 1
Paragraph Comprehension	41	41	0
Use of Index	42	62	+ 20
Selection of Key Words	45	55	+ 10
Total Median Score	42	52	+ 10

* These percentiles are derived by using the Norms given for ninth graders in the 1939 test manual. This adjusts for 12 months of the 14-month difference in the ages of the 1944-45 and 1976 samples.

The bar representations of percentiles for the nine subtests and for the Total Median Score demonstrate the close performance in 1944-1945 and in 1976 when age is not considered, and the marked improvement in the performance of the 1976 sample when compared to the 1939 norms for students their age.

Figure 3

A Bar Representation of Percentile Comparison of the Performance of Indiana Tenth Grade Students in 1944-1945 and That of Their 1976 Counterparts--Unadjusted and Age-Adjusted on the Iowa Silent Reading Tests (BM Edition)-Advanced (1939)



T-Score comparison--tenth grade, adjusted. As with the unadjusted tenth grade results, the mean standard scores were converted to T-Scores and compared. T-Score comparisons are basically the same as the results with the percentile comparisons in Table 9. Small differences are minimized with T-Score comparisons.

Table 9

Comparison of T-Scores of Achievement of Indiana Tenth Graders (1944-45 and 1976) on the Iowa Silent Reading Tests (BM Edition)-Advanced (1939) with Adjustment for the 14-Month Age Difference Between the Two Samples

Test	Mean T-Score Achieved by 1944-1945 Students	Mean T-Score Achieved by 1976 Students with Age Adjustment	Difference 1944-1945 Minus 1976 T-Scores
1. Rate	49.1	50.9	+ 1.8
2. Comprehension	47.3	50.0	+ 2.7
3. Directed Reading	46.7	50.0	+ 3.3
4. Poetry Comprehension	48.6	49.0	+ .4
5. Word Meaning	47.3	50.0	+ 2.7
6. Sentence Meaning	45.8	49.5	+ 3.7
7. Paragraph Comprehension	47.4	47.4	0
8. Use of Index	47.5	52.9	+ 5.4
9. Selection of Key Words	48.9	51.1	+ 2.2
Total Median Score	48.0	50.0	+ 2.0

Part IV

CONTEXT

Limited demographic and economic data suggest differences in the societal context of the 1944-1945 and the 1976 samples. In addition, dropout data for the two periods is significant to the interpretation of the tenth-grade test data.

The educational context for the two periods is sketched by comparable data gathered in the 1944-1945 and 1976 surveys.

A Contextual Interpretation

Any interpretation of data from tests given in time periods as far apart as 1944-1945 and 1976 ought to consider the contexts in which the data was collected. To do this so as to appropriately weigh all the possible variables that could have affected the results would be a massive task, and any attempt at a definitive analysis lay beyond the scope of this study.[9] In comparing the performance of students from periods separated by such a broad span of time, however, the study demanded some consideration of the probable influences of societal and educational factors, such as demographic changes in Indiana, changes in the economics of the two periods, and changes within the school between 1944-1945 and 1976.

This part of the report will note some societal data that exemplifies context differences between 1944-1945 and 1976. The effects that such differences might have on the performance of children on a standardized reading test are discussed in the last part of this report as tentative conclusions. Some of those effects, of course, come as children live and learn outside the school; but many of them which may have had more immediate impact on test performance are changes within the school--educational changes--which come about as a result of the societal changes. One factor, school dropout, has special potential for the analysis of the tenth-grade test data.

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[9] Paula Blomenberg, who is in the process of writing her doctoral dissertation in reading at Indiana University is conducting a more intensive survey of the contextual societal and educational features in Indiana between 1940 and 1976. While consulting many other sources, she conducted the survey accompanying the 1976 administration of the tests. Her data are the source for most of the statistics in this part.

The survey data of the 1944-1945 testing were matched in the 1976 study, which also sought much additional information on the school setting. The survey data on the schools which could be matched between the two testing periods are presented here along with some general educational data available for the two periods; their possible impact on the test results are discussed under Conclusions, Part V.

Demographic Changes

As Indiana's population increased, it became more urban. Between 1940 and 1970, the state's total population grew over 50 percent from 3,427,796 to 5,302,000. In 1940 there was an average of 94.4 persons per square mile; in 1970 there was an average of

143.3 persons per square mile.[10] There are several reasons for the increase in Indiana's population.

Indiana industries began attracting more persons to the state during the World War II years, and thus this change in population was well underway when the 1944-1945 study was conducted. An indication of this growth, oddly enough, is found in the state's population drop of one percent during the World War II years. This drop is based on "in-residence" citizens--that is, Indiana citizens away from the state in the armed forces were counted as population loss. The one percent drop was only one-third of the drop experienced nationally, and it was equal in number to only one-fourth of the number of Hoosiers who went into the armed forces. Thus this drop actually indicates the beginning of an extended period when Indiana's industries were drawing new citizens into the state. The number of Black persons and persons of Spanish heritage nearly doubled between 1940 and 1970--from 3.6 to 7.1 percent of the population. Census figures show that

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[10] The statistics in this section are from the 1940 and 1970 U.S. Census Bureau Reports.

11 percent of the school population in 1976 was non-white, while in 1940 it had been .04 percent.

Population shifts. One of the societal changes most clearly documented for Indiana between 1940 and 1970 is an approximate 10 percent shift in population from rural to urban. The Bureau of Census figures show that the state's rural population decreased from 44.9 percent to 35.1 percent, the urban population increasing from 55.1 percent to 64.9 percent. And in rural Indiana, there was an increase in non-farm residents. The percentage of employed workers who were farmers decreased between 1940 and 1970 from 15 percent to 4.3 percent. This is a 70 percent drop within that occupation. (Other occupational shifts are discussed in a following section.)

These changes were evident in population shifts in Indiana that were still occurring in the 1970's. While the state's population increased slightly between 1970 and 1976, the number of residents decreased in 24 of 78 counties. A study of these counties indicates that this is a shift toward the suburbs around larger population centers. The number of non-rural communities (those with more than 2,500 persons) had increased from 98 in

1940 to 151 in 1970; and urban areas--those with 100,000 or more persons--had increased from four to six in that period. These six areas do not include highly populated Indiana areas that are contiguous to urban areas in other states, such as Cincinnati and Louisville.

Economic Changes

The prosperity of Indiana citizens increased between 1944-1945 and 1976 and was accompanied by an occupational shift.

Per capita income. The real dollar income of Indiana citizens was almost twice as high in the 1970's as it was in the 1940's. Using the 1972 dollar value, for which conversion ratios are available,[11] the $541 per capita income figure for 1940 translates to $1,858. The figure for 1976 is $5,624 and translates into 4,693 1972 dollars. In spite of higher taxation, this represents a significant increase in the affluence of Indiana citizens.

Occupational shifts. An analysis of the percentage changes in types of occupations in the Indiana work force between the

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[11] The 1972 dollar was used with conversion ratios in an Economic Report of the President transmitted to Congress (Washington, D.C.: U.S. Government), 1977.

1940's and 1970's gives a general indication of a population with many persons moving from common laboring types of jobs to service-type and more specialized--presumably higher paying--jobs. The percent of Indiana workers who were craftsmen, foremen, and kindred workers increased only 1.5 percent between 1940 and 1970; but professional and technical non-domestic service workers increased over 5 percent. Laborers--including farm laborers--decreased by 7.4 percent and domestics from 1.1 to .2 percent. The percentage of workers who were farmers and farm managers decreased from 12.7 and 2.1 percent and this reduced number of farmers were farming an average 165-acre farm compared to the average 107-acre farm in 1940.

A look at the percentage of workers in manufacturing in Indiana indicates that aside from the wage increase indicated by per capita income, manufacturing's role in the economy was probably very similar in 1944-1945 and 1976. The percentage had risen from 30.4 percent in 1940 to 35.6 percent in 1970. By 1970, however, it was several points higher than it was to be in 1976. By 1977, it was about 33 percent. In 1940, 5 of 10 new jobs were in manufacturing, while by 1977 only 3 of 10 were.

School Dropout

Related closely to World War II and to results of societal changes, school dropout data may have special significance to the comparison of tenth grade achievement between 1944-1945 and 1976.

Generally, more Indiana children have stayed in school longer over the years. According to Bureau of Statistics figures, the average Indiana citizen had 7.5 years of schooling in 1940 and 12.1 years in 1976. Census figures indicate that in 1940, the legal age for dropping out of school came between the ninth and tenth grade or in the course of the tenth grade. An impetus for dropping out of school in 1944-1945 was created by World War II. After an unemployment rate of 14 percent in 1940 (Census), there were, in mid-1943, when production was at its peak, jobs available in defense industries for those who wanted them; and about this time industry began hiring minors for full-time work. Many teenagers turning 16 found the high pay of such a job with all its overtime more attractive than struggling with school. By 1944, the job market was drying up as servicemen returned; there was concern in the state about a general increase in unemployment, and there were layoffs in some industries. A sizeable number of youngsters who would have been sophomores tested in the 1944-1945 study, however, had entered the job market before mid 1944.

The percentage of dropouts in grades 7-12 in the 1975-1976 academic year for the state of Indiana was 4.43 percent.[12] The dropout rate in the 1943-1945 period was much larger. For example, in 1943-1944, there were 52,661 ninth grade students in public schools in Indiana. In 1944-1945, when these same students would have been in tenth grade, the population of tenth grade students was only 45,061, a decrease of 14 percent. The reasons for this alarming dropout rate were studied by the Indiana Department of Public Instruction:

> *In December, 1943, Dr. C. T. Malan, State Superintendent, estimated that more than 18,000 students, or about one-tenth of the total high school enrollment, had given up classroom exercises in favor of military service or defense work. A survey conducted by this office showed that in the two years following the outbreak of the war, 2,975 boys had dropped out of school to join the service and that 8,025 had chosen to work rather than study. Almost as alarming was the fact that 7,456 girls had left school*

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[12] A dropout is a student who withdrew during the 1975-1976 school year and did not re-enroll in another public school during the school year. This information was provided by the Division of Educational Information and Research, Department of Public Instruction, Harold H. Negley, Superintendent.

> *before finishing their secondary education. Although many of these girls were attracted by high paying positions in industry, others simply chose to marry high school classmates and travel with them from service training camp to camp in preference to staying at home and completing work for their high school diplomas. (Carnes, 1955, pp. 599-600.)*

Another study of the problem (State of Indiana Department of Public Instruction [IDPI], September, 1946) placed ninth grade dropout in 1943-1944 at 10.3 percent of that population and tenth grade dropout in 1944-1945 at 11.1 percent. These figures, however, did not include students who dropped out during the second (spring) semesters of those years. A survey of Indiana principals indicated the prevalent reasons for dropping out of school:

	Percentage of Dropout
Going to work for wages	24.0
Joining the armed forces	20.0
Poor school marks and dislike of school, or lack of interest	10.2
Marriage	9.5
Reaching the age of 16	8.0
Other reasons combined	28.3

The report noted that the withdrawal of boys due to induction in the armed forces posed special educational problems.

Educational Changes

The societal phenomena and changes in Indiana between 1944-1945 must certainly have effected changes in the state's schools, and the performance of children in those schools on standardized tests would become a link in that causal chain. The sixth-grade surveys conducted in 1944-1945 and in 1976 afford comparison of the school context on several revealing factors[13] that figure in the conclusions of this study (Part V).

Sixth-Grade Survey: 1944-1945 and 1976

Responses were received from 117 elementary schools (100 percent of the sample) in the 1976 survey. From 47 of these, one response was received; multiple responses, ranging from 2 to 9, were received from 70 schools. The total number of responses was 251. For the items dealing with school data, one questionnaire for each school with multiple responses was selected. All 251 were compiled for the items dealing with teacher and class information.

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[13] In addition, the 1976 survey collected data on several additional factors. Blomenberg is collecting correlating data for the 1940's for her more intensive analysis of the relationship of school context to performance on the ISRT.

Seven questions on the 1976 sixth-grade survey had been asked of the teachers and principals in the 1944-1945 survey and were reported. Thus comparative data can be reported for those aspects of the educational context. The information from the questions generated data on 1) length of school year, 2) number of elementary classrooms in the building, 3) number of sixth graders in the school, 4) number of grades in classroom, 5) number of class minutes given daily to reading, 6) number of class minutes given weekly to reading, and 7) whether reading was taught as a separate subject, with social studies, or both.

Length of school year. The 1976 sample had the advantage of longer school years. The data presented in Table 10 shows that the average school year in 1944-1945 was 8.6 months, while in 1976, it was 9.4 months. None of the 1976 schools reported a school year shorter than 9 months; over half of the schools in the earlier study did. Although the 1944-1945 study shows no evidence that this factor affected performance on the ISRT, any assumed advantage must go to the 1976 sixth graders.

Table 10

Length of School Year (in Months) in Indiana for Sixth Graders in 1944-1945 and 1976

	1944-1945		1976	
Months	# of Schools	% of Schools	# of Schools	% of Schools
8	373	51	0	0
8½	4	.5	0	0
9	260	35.6	3	1.2
9¼	13	1.8	109	44.5
9½	52	7.1	113	46
10	29	4.0	26	8.1
Average:	8.6 months		9.4 months	

Although the 1944-1945 report concluded that length of school year did not relate significantly to performance on the ISRT, another Indiana study (State of Indiana Department of Public Instruction [IDPI], 1944) concluded that sixth graders from schools with longer school years did perform significantly better on the Intermediate Language Arts Tests of the Stanford Achievement Test, Form DM (pp. 63, 64).

Number of elementary classrooms in the building. There were nearly three times as many classrooms in the 1976 school as there were in the 1944-1945 school. In the earlier study, there were 79 one-room schools reporting; there was only one in the 1976 study. As Table 11 shows, a majority of the 1976 schools reported over 10 rooms, while a majority of those in 1944-1945 had under 5. The averages are about 4.9 for 1944-1945 and 12 for 1976.

Again the 1944-1945 study using the ISRT did not find this factor significantly related to performance, but the 1944 IDPI study using the Stanford found the impact of this factor mixed depending on the subtest. Higher achievement generally related to multiple-room schools (pp. 73, 74).

Table 11

Number of Elementary Classrooms in the Building for Indiana Sixth Grades, 1944-1945 and 1976

	1944-45			1976		
Number of Classrooms	Number of Schools	Percentage of Schools	Cum %	Number of Schools	Percentage of Schools	Cum %
1	79	11.4	11.4	1	.4	.4
2	85	12.3	23.7	2	.8	1.3
3	101	14.6	38.3	8	3.4	4.6
4	83	12.0	50.3	2	.8	5.5
5	40	5.8	56.1	3	1.3	6.7
6	89	12.9	69.0	12	5.0	11.8
7	36	5.2	74.2	2	.8	12.6
8	73	10.6	84.8	6	2.5	15.1
9	25	3.6	88.4	19	8.0	23.1
10	79	11.4	99.8	13	5.5	28.6
11-15*	0			63	25.1	55.0
16-19*	0			63	26.6	81.5
20+	0			44	18.5	100.0
Average	4.9 classrooms			12 classrooms		

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* In averaging, the figures for gradation on this and other tables in this section that span more than one increment are figured at the median figure, at the top figure for lowest spans, and at the bottom figure for top spans.

Number of sixth graders in the school. Table 12 shows the growth in school enrollment between 1944-1945 and 1976. Thirteen percent of the schools in the earlier sample reported having five or less sixth graders; 87 percent of the schools had from 16 to 55. In 1976, the sample schools started at a point where 45 percent of the earlier sample left off, and 61 percent of the 1976 schools had more sixth graders than any of those in the 1944-1945 sample.

Table 12

Number of Sixth Graders in the School for Indiana Schools in 1944-1945 and 1976

	1944-1945			1976		
Number of Students	Number of Schools	% of Schools	Cum %	Number of Schools	% of Schools	Cum %
1- 5	96	13.0	13.0			
6-10	123	16.8	29.8			
11-15	120	16.4	45.2			
16-20	101	13.8	59.0	1	.9	0.9
21-25	88	12.0	71.0	6	4.6	5.5
26-30	69	9.4	80.4	5	3.9	9.4
31-35	56	7.7	88.1	3	2.3	11.7
36-40	27	3.7	91.8	8	6.2	17.9
41-45	17	2.3	94.1	9	7.0	24.9
46-50	13	1.8	95.9	9	7.0	31.9
51-55	21	2.9	98.8	9	7.0	38.9
56-65				16	12.0	51.2
66-75				5	3.9	55.1
76-100				28	21.7	76.8
101-125				13	9.9	76.7
125-150				4	3.1	89.8
151-175				5	3.9	93.7
176-200				1	0.9	94.6
200-300				4	3.1	97.7
300+				3	2.3	100.0

Number of grades in the classroom. More classrooms in 1944-1945 contained children at more than one level than did the classrooms of the 1976 sample. Table 13 shows that less than 7 percent of the classrooms in the 1976 study housed more than one grade, while in 1944-1945, 62 percent had more than one grade; 58 (8.3 percent) had eight. With the exception of these one-room schoolhouses, however, over 70 percent had two or less and another 19.7 percent had less than five. The average for 1944-1945 was 2.5.

The 1944 IDPI found that "in general, high achievement is most closely related to schools of 5-21 rooms." (pp. 73, 74.) Such schools would be less likely to mix grades in one room.

Table 13

Number of Grades in the Classroom for Indiana Sixth Grades, 1944-1945 and 1976

	1944-1945			1976		
Number of Grades	Number of Schools	% of Schools	Cum %	Number of Schools	% of Schools	Cum %
1	197	27.6	28.0	229	93.5	93.5
2	301	42.2	70.8	14	5.7	99.2
3	68	9.5	80.5	2	.8	100.0
4	70	9.8	90.5			
5	9	1.3	91.5			
6	5	.7	92.2			
7	4	.6	91.8			
8	58	8.1	100.0			
Averages:		2.5 grades			1.08 grades	

Number of class minutes given daily to reading. Table 14 shows that teachers in the 1976 sample were giving more than half again as much more daily time to teaching reading than those in the earlier sample. Over 80 percent of the 1976 teachers gave reading instruction 50 or more minutes a day, while 87.5 percent of the 1944-1945 teachers devoted 50 minutes or less to teaching reading. The earlier responses are evenly distributed along the time-line, with over 60 percent of the teachers devoting from 30 to 50 minutes a day to reading instruction.

Surprisingly, the earlier study using the ISRT could not conclude from its analysis that longer periods of instruction improved achievement; but if it does, the 1976 sixth graders had the advantage. Even more surprising, the 1944 IDPI study using the Stanford found an inverse relationship between time spent on reading instruction and performance on particular subtests (pp. 56, 57.)

Table 14

Number of Class Minutes Given Daily to Teaching Reading to Indiana Sixth Graders, 1944-1945 and 1976

		1944-1945			1976	
Class Minutes	Number of Schools	% of Schools	Cum %	Number of Schools	% of Schools	Cum %
10	17	2.5	2.5	0	0	0
15	41	6.0	9.3	1	.4	.4
20	54	7.9	17.2	1	.4	.8
25	42	6.1	23.3	0	0	.8
30	119	17.4	40.7	8	3.4	4.2
35	44	6.4	47.1	1	.4	4.6
40	119	17.4	74.5	11	4.6	9.2
45	64	9.3	73.8	18	7.6	16.8
50	94	13.7	87.5	34	14.3	31.1
55	8	1.2	88.7	15	6.3	37.4
60	65	9.5	98.2	69	29.0	66.4
65	2	.3	98.5	7	2.9	69.3
70+	6	.9	100.0	72	30.7	100.0
Averages:		37 minutes			58 minutes	

Number of class minutes given weekly to reading. The data in Table 15 on class minutes given weekly to reading shows that the 1976 sample had the advantage of more reading instruction: 86.6 percent of the teachers who responded in the 1944-1945 survey reported teaching reading less than 250 minutes a week and 62.1 percent of those responding in the 1976 survey reported teaching it more than 254 minutes. As with the minutes daily, the 1976 average is more than half again as long as the 1944-1945 average.

Table 15

Number of Class Minutes Given Weekly to Teaching Reading in Indiana Sixth Grades, 1944-1945 and 1976

	1944-1945			1976		
Minutes Weekly	Number of Schools	% of Schools	Cum %	Number of Schools	% of Schools	Cum %
Up to 90	115	16.6	16.6	0	0	0
90-175	181	26.1	42.7	9	4.7	4.7
176-254	304	43.9	86.6	62	33.2	37.9
255-354	80	11.5	98.1	71	38.0	75.9
355-374	4	.5	98.6	6	3.2	79.1
375 +	7	1.0	99.6	39	20.8	99.9
Averages:	184 minutes			283 minutes		

Reading taught as a separate subject, with social studies (other content areas), or both. Perhaps because this question was rephrased in 1976 to ask whether reading was taught in combination with "other content area subjects" rather than with "social studies," three times as many 1976 teachers said that they were teaching reading both as a subject in itself *and* with another subject, as shown in Table 16. Another probable explanation is the contemporary emphasis placed on making reading real by teaching it as children actually read from their texts. In both surveys, fewest teachers said they taught reading *only* as a part of social studies or another subject.

Table 16

Reading Taught as a Separate Subject, with Social Studies, or Both* in Indiana Sixth Grades in 1944-1945 and 1976

	1944-1945			1976		
	# of Classes	% of Classes	Cum %	# of Classes	% of Classes	Cum %
Separate Subject	684	44.5	44.5	59	24.2	25.5
With Social Studies (Content Area)	282	18.3	62.8	5	2.0	27.5
Both	571	37.2	100.0	180	73.8	100.0

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* The 1976 teachers were asked whether they taught reading combined with "other content area subjects" rather than with "social studies."

Tenth-Grade Survey: 1944-1945 and 1976

Tenth grade teachers at each of 31 schools housing the sample tenth grade population (100 percent of the school sample) completed the "then and now" questionnaire. One questionnaire was received from each of 21 schools taking part in the study. The remaining 10 schools sent multiple questionnaires. The number of tenth grade teachers completing the questionnaire at these schools ranged from 2 to 12. The total number of questionnaires received from teachers was 108.

Survey data on only two factors were reported in the 1944-1945 study: Length of School Year and Size of the School (enrollment). The 1976 study did not survey the latter, but asked instead the size of the sophomore class. Thus the length of school year is the only comparable factor available from the studies. The 1976 survey asked for a report in days. The data for 1944-1945 is reported by months in Table 17 and that for 1976 in days is reported in the paragraph following the table.

Table 17

Length of School Year for Indiana Tenth Grades, 1944-1945

Months	# of Schools	% of Schools	Cum %
8	142	59	59
8½	6	3	62
9	5	31	93
9¼	1	0	93
9½	5	2	95
10	11	5	100

In 1976, 30 of the 31 schools responded to this question. The length of the school year ranged from 175 days to 185 days; 43.3 percent (13 schools) had a school year consisting of 180 days. Considering vacation time, the 180-day school year correlates approximately with the 9-month school year, which 31 percent of the 1944-1945 sample reported. Generally, the school year for earlier sample tended to be shorter.

Part V

CONCLUSIONS

Because there was little difference in the grade equivalent performance of the 1944-1945 and 1976 students on the Iowa Silent Reading Tests *and because the age-adjusted performance of the 1976 students was markedly higher than their 1944-1945 counterparts, the assumption that the reading abilities of students is declining is unsupported by this study.*

Continued study of the various context factors is needed to substantiate the indications that certain societal and educational factors favor the samples from one time period or the other. More comparison studies that attempt to overcome the difficulties inherent in comparing the achievement of broad samples of students over long periods of time are also recommended.

The Indication That Students Are Reading Better Recommends Additional Research

The major conclusion of this study is drawn from the test data of the two periods and argues that the comparison of scores from the Indiana samples from the two periods has important implications in the light of the current concern about reading education.

Since the study must conclude that current educational decisions are being made on assumptions that this data contradicts (Conclusion 2), it offers as a final general conclusion several recommendations for future research that can aid in the interpretation of the data from this study and in informing those whose decisions may affect future reading education.

Conclusion 1: The Reading Skills Achievement of Today's Children Appears to be Higher Than That of Children from Years Past

Disregarding the age differences of the samples from the two periods tested in this study, the reading achievement of Indiana sixth and tenth graders, as measured by the Iowa Silent Reading Tests-BM Edition (1943, 1939), was about the same in 1976 as it was in 1944-1945.

When the 10-month age difference in the sixth-grade samples and the 14-month age difference in the tenth-grade samples are considered, the achievement of the 1976 students was markedly higher than their 1944-1945 counterparts. In addition, the possibility that dropouts could have made an even greater difference in the tenth-grade samples recommends consideration of dropout data in the interpretation of the tenth-grade test results.

Unadjusted ISRT Scores Show Little Difference in Performance

Using only grade equivalent norms for the sixth graders, and grade equivalent percentile rank norms for the tenth graders, Indiana students from 1944-1945 and from 1976 scored about the same on the ISRT.

Sixth grade. On a strict grade-equivalent comparison--with no consideration of the 10-month age difference, the 1976 sixth graders outscored the 1944-1945 sample on four of the eight subtests and scored at the same grade equivalent on two. The 1944-1945 sixth graders scored one month higher on Total Median Score. On only three of the subtests were differences of three months or more found between the samples. The earlier sample scored four months higher than the 1976 sample on Paragraph Comprehension, and the 1976 sixth graders scored eight months higher than their earlier counterparts on Alphabetizing and four months higher on Use of Index. Those who would place higher significance on Paragraph Comprehension than on other subtests should note that the two samples scored the same on the Comprehension and Sentence Meaning subtests and that the 1976 sample scored higher than the 1944-1945 sample on the Word Meaning subtest. Overall, there was very little grade equivalent difference for sixth graders over the 30-year span.

Tenth grade. At the tenth grade, where ISRT achievement scores can be translated into normed grade equivalents or percentiles, there is relatively little difference in the overall performance of the 1944-1945 sophomores and the unadjusted performance of the 1976 samples. The 1976 tenth graders scored higher than their earlier counterparts on four of the subtests and were outscored by the 1944-1945 sophomores on five subtests and on Total Median Score. On three of the subtests on which they scored higher than the 1944-1945 sophomores, the 1976 sample excelled by more than three percentiles, the point at which this study arbitrarily decided differences are especially meaningful. The earlier sample excelled by more than three percentiles on two subtests. The difference for Total Median Score was two percentiles. Thus the overall performance difference is slight.

With Adjustment for Age Differences The 1976 Students Scored Markedly Higher

Since the manual for the 1943 edition of the Elementary ISRT provides a conversion table to translate standard scores into either normed age or grade equivalents, it was possible to make a comparison that adjusted for the 10-month difference in the 1944-1945 and 1976 sixth graders by taking the corresponding age equivalents for the average scores of the samples from the two periods and adding 10 months to the age equivalent of the 1976 sample.

To make a comparison for the achievement of the tenth graders of the two periods that adjusted for the 14-month difference in age, the 1976 percentiles were taken at the ninth grade norms instead of at the tenth grade norms.

Sixth grade comparison--adjusted. When the average standard scores for the sixth graders are translated into corresponding age equivalent norms and 10 months are added to the age equivalents of the 1976 sample, the latter scored from 6 to 20 months higher than the 1944-1945 sixth graders, depending on the particular subtest score considered. The difference for Total Median Score was 8 months.

Tenth grade comparison--adjusted. In comparing achievement on the 1939 edition of the Advanced ISRT by converting the 1944-

1945 scores to percentiles normed for the tenth grade and the 1976 scores to percentiles normed for the ninth grade, one can adjust for 12 of the 14-month age difference between the samples.

With this adjustment, the 1976 sophomores outscored those in 1944-1945 on eight of the nine subtest scores. On six of these, the differences were from 7 to 20 percentiles. On the other subtest score, Paragraph Comprehension, the adjusted 1976 score is the same as in 1944-1945; and on Total Median Score, the 1976 sophomores scored 10 percentiles higher than the earlier sample when age is considered.

The Adjustment for Age Is a Valid Attempt to Equate 1944-1945 and 1976 Experience

Not only do precedents for considering age-equivalent instead of grade equivalent comparisons recommend the adjustment for age differences in this study, but those differences can logically be argued to represent more school experience for the 1944-1945 samples. The age differences appear to be explained by the stricter retention policies of the schools of the earlier period. If the average sixth grader has been held back for the better part of a school year, he has been receiving classroom instruction that much longer.

It is interesting to note, also, that in the light of differences in admission policies between the periods, the 10- and 14-month age difference figures are probably minimal. In the 1940's, children were allowed to begin school in the fall or in the spring semester, and the fall admission, for example, was allowed if the child would be turning five (for kindergarten) or six (for first grade) before the end of the calendar year. Contemporary Indiana policies allow admission only in the fall and usually the child must be the entrance age by November. The effect of this difference in policies would be to make the 1976 students older--not younger--than the 1944-1945 students and suggests that the 10- and 14-month differences could be minimal.

Two Other Factors Need Special Consideration in Interpreting the Data

In addition to the difference in ages between the samples. interpretation of the data should consider the probable effect of dropout on the tenth-grade data and the possible bias of the measurement instrument in favor of the 1944-1945 sixth and tenth graders.

Dropout May Have Eliminated Many Low Achievers from the 1944-1945 Sample

It seems appropriate in interpreting the tenth-grade data to consider the possibility that a difference in the dropout rate between the two periods tested could mean that the spread of abilities within each of the two samples differed to a degree that could significantly favor the 1944-1945 sample. The enrollment of the 1944-1945 Indiana sophomore class was 14 percent lower than the enrollment for the same class the year before, when they were ninth graders.

Although this study has found no corresponding dropout rate for the years 1975-1976, it has found in U.S. Census data that the average number of years of schooling for an Indiana citizen rose 4.6 years between 1940 and 1970. It seems apparent that along with other factors, the increasing value that our society has placed on education has encouraged young persons to stay in school longer. This clearly indicates that the school dropout rate between 1944 and 1976 declined. In addition, the data showing a 14 percent dropout for the 1944-1945 sophomores between their ninth and tenth year in school indicates that many of the 1943-1944 ninth graders who dropped out of school were attracted to lucrative jobs in wartime industry.

It is probable that these youngsters included many for whom success in school had not come easily. If this was true, they were probably heavily weighted to the lower end of the general ability scale and included many youngsters with a variety of learning problems. This would mean that the sample drawn from the 1944-1945 sophomore class included proportionately fewer subjects who might score poorly on the ISRT than a sample from tenth-grade classes of subsequent years, when the job market became more crowded and a generally more positive attitude toward the benefits of education led to a decreasing number of dropouts. This observation suggests that the reported test score differences favoring the 1976 sample are probably minimal, because had the 1944-1945 sophomore class included the spread of abilities it had in its freshman year, its average scores could have been lower

The Measurement Instrument May Have Been Biased to the Advantage of 1944-1945 Students

The curriculum that frames the instruction of students has a direct impact on the achievement of those students. A fair measurement of that achievement will use an instrument that is designed to measure what that curriculum professes to teach. Both critics and defenders of contemporary curricula will agree that they are different from those of the mid 1940's. This is true because curricula have developed in an attempt to respond to societal changes that dictate different needs and values. That is, children today, it is argued, are taught to read within curricula designed for the 1970's. Normally, their reading achievement is assessed with instruments designed to measure what those curricula stress in instruction.

In order to compare the achievement of students instructed under different curricula prevalent in two different time periods, it was decided to measure the samples from both periods with the same instrument. Since the 1944-1945 study could not be repeated, it was necessary to use the instrument used in that period--the Iowa Silent Reading Tests (BM Edition)-Elementary (1943) and Advanced (1939).

Thus, by necessity, a bias favoring the 1944-1945 students may have been built into the comparison with the 1976 students. Since the 1943 and 1939 versions of the ISRT were built to measure the curricula of that period, it is possible that the questions asked on the instrument were more likely to relate to what was valued, stressed, and taught in the earlier period than to the experience of the 1976 students.

If such a bias is a fact of this study, it is interesting that the performance of the 1976 students was approximately equal to their 1944-1945 counterparts on a strict grade level comparison and was markedly superior on comparison that considers the fact they were considerably younger.

Purpose of the ISRT. The general purpose underlying the 1943 Elementary and the 1939 Advanced ISRT was to assess what was a shift in the curriculum of the schools. Prior to the development of the ISRT, the emphasis in the elementary reading curriculum was on oral reading. Correct pronounciation, oral reading with appropriate intonation, and such things as voice projection and enunciation were emphasized. However, the curriculum had shifted to one in which understanding and applying what was read became more important. Silent reading of a variety of types of material took on greater emphasis. The ISRT was developed to assess the objectives of silent reading comprehension. The authors of the ISRT state the emphasis in this way: "Life situations demand an ability to grasp quickly and accurately the meaning of printed symbols. Only infrequently are we called upon to read orally."

On the Advanced test, the application of this principle related to the assessment of silent reading comprehension in content subjects such as history, geography, mathematics, science, and literature. The test authors contend that "progress in those subjects depends to a greater degree upon the ability of pupils to read rapidly and intelligently than upon any other single factor."

The attempt to assess comprehension and understanding on the ISRT led to the development of tests which sometimes assessed knowledge which a student might bring to the test rather than knowledge gained through reading. This is perhaps most noticeable on the Sentence Meaning subtest. On this subtest, examinees are to respond to questions with "yes" or "no." Questions on the Elementary Sentence Meaning subtest include:

- Is the Fourth of July a national holiday?
- Is manufacturing an important industry in America?
- Is it necessary for the President of the United States to be a citizen?
- Is treason to one's country punishable by death?

Advanced Sentence Meaning subtest questions include "Does fresh air inhibit the action of bacteria that cause tuberculosis?"

Some of the questions on the Sentence Meaning subtests seem to assess values or to call for a kind of moral judgment. The Elementary test asks:

- Does the United States need to save its forests?
- Is a conservative person usually radical in his point of view?
- Is it a good thing for a person to maintain his credit?
- Does a witness always tell the truth?

Value judgment in Sentence Meaning questions on the Advanced test include:

- Does allegiance to one's country imply loyalty?
- Is disagreement among the members of Parliament unusual?
- Is harmony between nations encouraged by the League of Nations?

Time bias. The administration of the 1943 ISRT caused some serious difficulties for the 1976 students; many were unable to complete the tests in the time allocated because their test-taking experience had not prepared them for the need to respond within such severe time limitations. At the time the ISRT was being developed, general belief guiding test construction was that the tests should be timed very carefully and that achievement should be dependent in part on rate.

From 1943 to 1970, test construction theory changed. Achievement tests were built so that time had less impact on the results. The concern became assessing "power" rather than a combination of "power and rate."

This change of philosophy in test construction can be described best by examining the difference between two subtests on the 1943 Elementary and 1939 Advanced ISRT and 1973 revisions.[14]

Elementary

Subtest	1943 ISRT		1973 ISRT	
	No. of Test Items	Time	No. of Test Items	Time
Word Meaning	55	9 min	50	15 min
Paragraph Comprehension	30	7 min	38	28 min

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[14] Farr, Roger (Ed.). Iowa Silent Reading Tests: Levels 1 and 2. New York, Harcourt Brace Jovanovich, 1973.

Advanced

Subtests	1939 ISRT		1973 ISRT	
	No. of Test Items	Time	No. of Test Items	Time
Word Meaning	70	7 min	50	15 min
Paragraph Comprehension	36	9 min	50	26 min

Only minor differences exist in the format of the test items in the two editions at each level. The difference in time allocation, however, is major. This difference could reflect a systematic bias favoring the 1944-1945 students who were experienced in taking tests that put a premium upon speed. By contrast, the 1976 students were used to tests that were liberally timed and could well have been frustrated by the tight timing of the 1939 test.

Reaction of 1976 teachers to the tests. The 1976 survey questioned teachers 1) as to how well the various subtests of the 1943 or 1939 ISRT covered their instructional objectives and 2) as to how difficult they thought the subtests were for the average student in their class. The results from these survey questions neither validate nor deny our supposition that the test may have been a built-in bias favoring the earlier subjects.

As can be seen by examining Table 18, the majority of the sixth-grade teachers who responded to the question on coverage judged the coverage of their instructional objectives by the 1943 tests to be adequate or better. The lowest rated tests in terms of coverage were Directed Reading, Sentence Meaning, and Alphabetizing. However even these tests had overall ratings of "adequate" to "quite good."

The 1976 teachers were also asked to list important instructional objectives that were not covered by this test. Teachers had to write their responses rather than just to respond to check items on a list. There were not a great number of responses. Those areas which were listed most often include

- Using reference materials
- Using study skills
- Sequencing events
- Reading charts and graphs
- Word recognition skills

The first two items on this list were mentioned most often; the last three items were mentioned by only a couple of teachers.

Table 18

Responses [illegible] Sixth-Grade Teachers in 1976 as to How Well the Coverage of 1943 ISRT-Eleme[illegible]lates to Their Objectives For Areas Covered on the Te[illegible]

Coverage	Comprehension	Directed Reading	Word Meaning	Paragraph Comprehension	Sentence Meaning	Alphabetizing	Use of Index
Very Good	40 (18%)	40 (17%)	53 (23%)	56 (24%)	47 (20%)	79 (34%)	79 (34%)
Quite Good	98 (44%)	77 (33%)	88 (38%)	86 (37%)	73 (32%)	71 (30%)	80 (34%)
Adequate	70 (31%)	77 (33%)	73 (31%)	81 (35%)	78 (34%)	61 (26%)	56 (24%)
Rather Poor	11 (5%)	33 (14%)	12 (5%)	7 (3%)	22 (10%)	20 (9%)	12 (5%)
Very Poor	3 (1%)	7 (3%)	7 (3%)	2 (1%)	9 (4%)	2 (1%)	6 (3%)
Teachers Responding	222	234	233	232	229	233	233

Nor did the sixth grade teachers who administered the ISRT in 1976 rate the tests as too difficult for the average pupil in their classes. The results of this rating are presented in Table 19. The largest percentage rated the test's difficulty "about right," the second largest percentage rated the tests "somewhat too difficulty," and the third largest percentage rated the tests "considerably too difficult." Only a very small percentage of the teachers rated the tests "somewhat too easy" or "considerably too easy."

Table 19

Responses of Indiana Sixth-Grade Teachers in 1976 as to the Difficulty of the 1943 ISRT-Elementary for the Average Students in Their Classes

Difficulty	Comprehension	Directed Reading	Word Meaning	Paragraph Comprehension	Sentence Meaning	Alphabetizing	Index
Considerably Too Difficult	15 (7%)	39 (17%)	25 (11%)	18 (8%)	15 (7%)	18 (8%)	14 (6%)
Somewhat Too Difficult	92 (41%)	100 (44%)	77 (33%)	71 (31%)	64 (28%)	45 (20%)	41 (18%)
Difficulty About Right	116 (51%)	87 (38%)	117 (51%)	133 (58%)	137 (61%)	145 (63%)	149 (65%)
Somewhat Too Easy	2 (1%)	4 (2%)	9 (4%)	7 (3%)	8 (4%)	18 (8%)	22 (10%)
Considerably Too Easy	1 (1%)	1 (1%)	2 (1%)	1 (1%)	2 (1%)	3 (1%)	2 (1%)
Teachers Responding	226	231	230	230	226	229	228

A review of Table 20 shows that a majority of the tenth-grade teachers who responded judged the tests' coverage of their instructional objectives to be adequate or better. About one teacher out of six did not respond to this item. One of four teachers judged the poetry test as "rather poor" or "poor." Several commented that the test is not representative of poetry studied today, that it is obscure, and that the time allocation is unrealistic. One of nine teachers judged the sentence meaning test as "rather poor" or "poor." The "nature" of the test and the time limitation for students to take the test were points of teacher criticism.

The questionnaire provided the teachers an opportunity to list instructional objectives of their programs not covered by the test. Only two teachers mentioned objectives not covered: "written summaries" and "basic fiction material-story line coverage." These teachers commented that they did not have a specific reading program. It appears that while teachers were critical of the content of test items and the severe time limitations of the tests, they judged the 1943 test to provide adequate coverage of their programs.

Table 20

Responses of Indiana Tenth-Grade Teachers in 1976 as to How Well the Coverage of the 1939 ISRT-Advanced Relates to Their Objectives for Area Covered on the Test

Coverage	Comprehension	Directed Reading	Poetry	Word Meaning	Sentence Meaning	Paragraph Comprehension	Key Words	Index
Very Good	15 (17%)	11 (13%)	7 (8%)	21 (24%)	11 (13%)	16 (18%)	20 (22%)	22 (25%)
Quite Good	32 (36%)	28 (32%)	18 (20%)	27 (30%)	33 (38%)	30 (33%)	32 (36%)	26 (29%)
Adequate	34 (38%)	40 (45%)	37 (42%)	37 (42%)	32 (36%)	39 (43%)	29 (32%)	33 (37%)
Rather Poor	7 (8%)	8 (9%)	18 (20%)	4 (4%)	9 (10%)	5 (6%)	9 (10%)	8 (9%)
Very Poor	2 (2%)	1 (1%)	8 (9%)	0 (0%)	3 (3%)	0 (0%)	0 (0%)	0 (0%)
Teachers Responding	90	88	88	89	88	90	90	89

Table 21

Responses of Indiana Tenth-Grade Teachers in 1976 as to the Difficulty of the 1939 ISRT-Advanced for the Average Pupil in the Class

Difficulty	Comprehension	Directed Reading	Poetry	Word Meaning	Sentence Meaning	Paragraph Comprehension	Key Words	Index
Considerably Too Difficult	6 (7%)	10 (11%)	40 (43%)	10 (11%)	6 (7%)		1 (1%)	5 (6%)
Somewhat Too Difficult	37 (41%)	27 (29%)	26 (28%)	27 (30%)	24 (27%)	13 (14%)	13 (14%)	13 (15%)
Difficulty About Right	42 (46%)	48 (52%)	18 (20%)	45 (50%)	53 (60%)		54 (59%)	51 (57%)
Somewhat Too Easy	5 (5%)	6 (7%)	4 (4%)	7 (8%)	6 (7%)		19 (21%)	13 (20%)
Considerably Too Easy	1 (1%)	1 (1%)	4 (4%)	1 (1%)	0 (0%)		4 (4%)	2 (2%)
Teachers Responding	91	92	92	90	89	91	91	89

A review of Table 21 reveals a marked difference in how the 1976 teachers perceived difficulty across the various subtests. Whereas 15 percent of the teachers judged the Key Word Test to be "somewhat" or "considerably too difficult," 71 percent judged the Poetry Test to be "somewhat" or "considerably too difficult." The percent of teachers judging the difficulty to be from "about right" to "considerably too easy" is:

Comprehension	52%	Sentence Meaning	67%
Directed Reading	60%	Paragraph Meaning	n.a.
Poetry	28%	Key Words	84%
Word Meaning	59%	Index	79%

Thirty-four teachers took the opportunity to comment about the difficulty of the tests on this question: seven said the time was too short; nine mentioned the poetry test--most arguing that the selection was inappropriate; nine considered the directions confusing or unclear; three said that the Sentence Meaning subtest was ambiguous, biased, or assumed a set of national values; and three judged terms and selections to be obsolete or outdated.

Conclusion 2: The Results of This Study Contradict Our National Alarm

It is difficult, in the light of the general national assumption that the reading abilities of our children are decreasing at an alarming rate, not to be both encouraged by and concerned because of the results of this study.

Obviously, it is encouraging to find that in a representative state-wide sample, children are reading better for their ages than they were 30 years ago. The concern generated by these results is that without adequate research in carefully controlled comparisons, Americans are assuming that the opposite of what these results show is true and are reacting with decisions that can have serious consequences for our children. Inappropriate interpretations of instruments designed to predict other competency (e.g., the SAT and ACT) and reliance on comparison studies that are not broad enough or adequately controlled are leading many communities to adopt minimum competency testing as a magic cure for whatever might be causing the supposed decline in reading performance. Meanwhile, the same ungrounded alarm leads to attacks on school programs that have been developed over the same time span for which this study shows the improvement in student reading achievement. This criticism and the effects of minimum competency testing will reinforce each other as the latter leads to instruction geared to the tests and not to the needs of children.

Instead of reacting as many states have by installing minimum competency testing and narrowly conceived programs, we should continue to develop reading instruction that will enable our children to function effectively in contemporary society and continue to develop instruments that will measure the effectiveness of that instruction. In this way, testing would be used correctly to report the effectiveness of programs, rather than being misused to direct them.

Rather than "going back to the basics," we need to continue to attempt to meet one of the very basic needs of our citizens: the ability to use reading as a basic skill to succeed in contemporary society. The following conclusion answers to this charge. It recommends intensive research that gathers all the possible relevant data and searches for causal relationships between context factors and reading achievement.

Conclusion 3: The Changing Societal Context Between 1944-1945 and 1976 May Have Contributed to Changes in Educational Context That Favor The 1976 Students

The societal and educational changes sketched in Part IV (Context) of this report need expanding and detailing in research that clarifies any causal relationships 1) between the developing society in Indiana and the changes in its schools; 2) between the changes in the context of Indiana schools from 1944-1945 to 1976 and the test results of this study; and 3) between the life style changes in a more affluent and technically developed society and the learning opportunities and habits of its children.[15] Such research should consider numberous factors affecting education in the two periods including differences in curricula and teacher qualifications, a more detailed consideration of the possible impact of dropout data on differences in the tenth-grade samples from the two periods, and the impact of lifestyle changes--particularly television--on reading acquisition.

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[15] Blomenberg's study could achieve this, using the responses to the more extensive survey she conducted among the personnel in schools tested, the survey data from the 1944-1945 study, and other data available for the two periods.

A Larger, More Affluent Population Built Bigger, Better Equipped Schools

It seems probable, at this stage of the comparison, however, to hypothesize that the demographic and economic changes sketched in Part IV of this report led to changes in educational context that were significant for the two periods. Some of those changes resulted in differences that should have favored the 1976 students.

Demographic changes contributed. Population centers in Indiana grew as a result of a 50 percent increase in population, a 10 percent shift away from rural residence to urban and suburban residence and an accompanying shift in occupational endeavor from farming and common labor to service-type and more technical industrial jobs. This general development would in itself change the nature of school environment by creating the need for more classrooms in areas where the population become concentrated and less need for classrooms in the rural areas.

The need for urban schools was, at the same time, coupled to a general attitude that "bigger is better," which led to the building of new and bigger schools replacing smaller ones. The sixth grade surveys show that the 1976 school had two and one-half times as many sixth-grade classes in it as did the 1944-1945 school. The class size in the earlier school averaged around 20 children, while in 1976 it averaged about 27. This growth and consolidation was facilitated by numerous developments, such as more efficient transportation.

Economic changes contributed. Increased prosperity, which we have noted in a per capita income increase of nearly 100 percent, allowed the public the capital to build the schools and to build into them new facilities to teach the more specialized curricula that the public sensed its children should experience in order to get ready for survival and success in the increasingly technical world. And as this need for more specialized training materialized, it contributed to the development of bigger schools in consolidated systems that could provide the educational context for such training.

Educational Context Changes Deserve Intensive Study

It is generally believed the new educational experience for children--at once broader and more specialized--would benefit their performance on achievement measures, and it appears from this study that that is the case. It should be noted here, however, that when the achievement of children educated within the changed curricula is measured by an instrument designed to measure the achievement of the curricula offered before the change, the results of the mismatch favors the earlier achievers. This point is a necessary limitation in the design of the study, however. Generally, it appears that the changes in educational context should have favored the 1976 students, but intensive research could indicate which factors had what kind of influence.

The research recommended on the educational context of Indiana schools in 1944-1945 and in 1976 would, it is hypothesized, describe how reading programs were changed and developed between these years in an effort to have them instruct to the real interests and needs of contemporary children.

The present study produced some data that indicate how relevant additional study of the educational context may be. Together, the sixth-grade surveys from the 1944-1945 and 1976 studies reveal that the concern for reading skills as basic needs of children led through the years to a greater educational investment in reading instruction. During a school year that was an average .8 of a month longer in 1976 than in 1944, half again as much daily and weekly instructional time was given to reading by 1976.

The sixth grade surveys showed that in 1976, reading was taught both as a subject in itself and in combination with other subjects in twice as many schools as taught it both ways in 1944-1945. Other than producing this one comparison on instruction in the two periods, this study has not attempted to depict the changes in reading instruction in Indiana that could have affected achievement. Such an historical analysis could be important to the interpretation of the test results.

It is generally understood, too, that teacher certification changes since 1944 may have guaranteed teachers better prepared to teach reading, and a close analysis of the changes in teacher training effected by certification changes appears to be a project that, coupled to statistics revealing teacher experience, could indicate if teacher qualification may have played a role in the test results.

The question of retention as it relates to the age differences in the samples from the two periods is an important one. Research seeking data on school entry age, percentage of retentions, and any other factors that might explain the age difference could help establish how much of the extra age average for the 1944-1945 samples also represents years of school experience.

Finally, an intensive analysis of dropout data should attempt to prove or disprove the possibility that an abilities curve of the 1944-1945 tenth-grade sample would demonstrate that an unusually high percentage of its low achievers had dropped out of school between their freshman and sophomore years.

A General Analysis of Life Style Changes Could Help Focus on the Possible Impact of Phenomena Such as Television

The general impact of more prosperity is evident in society's life styles. Since 1945, for example, America has been united from coast to coast by multi-laned superhighways. With a higher income, one can afford the car and other expenses to travel, as well as gadgets, appliances, and toys to compete with reading. And just as these experiences can both compete for our time and can be educational, so we are unsure about the exact balance between how they discourage or encourage reading.

Very few Indiana children had ever seen television in the mid 1940's, but by 1976 it was a focal point of a majority of Hoosier homes. Television has had a tremendous impact on life styles and values. This is especially true for children. Had anyone told the teachers and parents of the post-World War II period that their grandchildren would be sitting in front of that electric box from 20 to 50 hours a week, they might have predicted the total demise of reading as an activity. Since effective reading instruction is structured on a child's interests and needs, it is obvious that television can contribute to developing the background and interests necessary for meaningful reading experiences, but generally it is accepted that the net effect of television on the reading habits of our children (as well as of adults) is negative. How much of what type of TV viewing is helpful or harmful is a subject of such potential import that it needs researching on an intensive scale.

Perhaps the increased prosperity of 1976 compared to 1944-1945 ought to operate to the overall advantage of the later sample in reading achievement comparisons. To mention an obvious and relevant advantage--attractive books, magazines, and other reading material abounded on a myriad of topics in 1976; in the war years printing was not rationed but was limited by national priorities. And readers had more money in 1976 than in 1944-1945 to buy reading material.

In this study, the impact of such societal and educational factors was only hypothetically assumed. The partial data presented indicate that there were differences in the two periods from which students were tested and that these differences might account for differences in the test results. When examined in relation to a critical review of the measurement instrument selected for this study, however, the contextual data available, suggest an advantage for the 1944-1945 students that stemmed from the decision to retest with the 1943 and 1939 editions of the ISRT.

Careful Comparison Can Reveal The Route to Higher Achievement

The national concern over the reading performance of children has created the need for studies that compare large samples of students from broad geographic areas over long periods of time. This study has attempted to make such a comparison, and since its results contradict the national pessimism, more such studies are recommended.

Comparison Studies Have Their Limitations

Other ready data, such as the 1944-1945 Indiana test data, should be matched; and perhaps some of that data will include information that 1) will eliminate some of the limitations of this study and 2) will allow for more interpretation in the light of comparable context. Ideally, some of any available data may be the result of a measurement instrument that can be duplicated without too much concern for it biasing the study.

All of these hopes reflect on the limitations of this study:

- Descriptive data on the 1944-1945 subjects was limited, thus limiting comparison to any such data that could have been collected on the 1976 students.

- The age differences noted in this study are based on U.S. Census data for Indiana. If it were possible to ascertain the actual ages of subjects in a comparison study, the indication of this phenomenon could be confirmed.
- There is no way to know if the 1976 sample may have been more "test-wise" than their earlier counterparts.
- The reports of the 1944-1945 study were available for the groups only and by classifications of the subjects that were much more relevant in the 1940's than in the 1970's. The actual test papers of the earlier students were not available for reanalysis.
- Explanation of the procedures and analysis used in 1944-1945 are limited.
- There was little control over the administration of the tests, and its adequacy and evenness between the periods can only be assumed.

- The 1976 sample could not be matched to the actual schools used in 1944-1945, and the stratification had to approximate a match on the 1944-1945 sample that was assumed representative because it tested 25 percent of the universe.
- The need to use the earlier editions of the ISRT saddled this study with the limitations of the test itself as a measure of both populations.

While almost all of these limitations are potentially inherent to a comparison study of this scope, they must be remembered in assessing the study's results. Even considering them, the results are certainly more valid than reliance on inappropriate data or studies that do not actually measure reading skills.

This Study Indicates We Have Been Headed in the Right Direction

The indication from testing large samples of Indiana sixth and tenth graders with the same test used over 30 years ago is clearly that their reading ability has improved, not decreased. Does this mean that today's schools are doing an adequate job of teaching reading? The answer appears to be "yes" in the sense that the average student in Indiana is developing the basic skills of reading. But in the sense that higher levels of performance are possible, the answer is "no."

Present emphasis on basic skills may be misplaced and may be a factor explaining the recent drop in many test scores. The concern for and emphasis on basic skills has resulted in a rash of exercises and games being used to provide practice in isolated skills to the detriment of exercising the total act of reading. If basic skills of reading could be defined in terms of the reading process and practice time spent in actually reading, higher levels of performance could be achieved. The proper relationship between practice on isolated skills and practice with the total process has long been an issue in American education. Thorstein Veblin (1918), made the point well:

> *The underlying...presumption...appears to be that learning is a...commodity to be produced on a piece-rate plan, rated..., measured, and counted and reduced to staple equivalents by impersonal, mechanical tests. In all its bearing the work is hereby reduced to a mechanistic, statistical consistency, with nummerical standards and units, which conduces to perfunctory and mediocre work throughout, and acts to deter both students and teachers from a free pursuit of knowledge.*

Whatever the role of isolated skills as "basics" in reading, the data in this study neither indicates that today's students acquire them to a weaker degree nor that increased emphasis of them will raise scores. A careful analysis of the educational context should reveal why the 1976 sample scored about equal to the 1944-1945 sample at a considerably younger age--why in an age comparison they outscored their earlier counterparts markedly. Most educators would have similar hypotheses why that was so; they would wager that the answer has a great deal to do with giving more time to teaching reading as a real-life activity that both stems from and builds interests, concepts, and values.

Misusing test data to attack the development that has emphasized education and made it more meaningful may sustain what appears to be the dismal myth that children today aren't taught to read; it may force further misuse of tests in minimal competency testing and accelerate the swing "back to basics." But it will not help us to continue to improve education so that our children can achieve higher levels of performance. What may help do that is careful research that tells us which of the change factors between 1944 and 1976 were most responsible for the performance differences found in this study.

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